

DECLARATION FOR THE PhD THESIS
To be inserted as the first page of the thesis

The undersigned

SURNAME | DI STEFANO |

NAME | GIADA |

Registration number | 1094630 |

Thesis title:

| KNOWLEDGE, INNOVATION, AND SOCIAL NORMS IN CREATIVE INDUSTRIES: |

| THREE ESSAYS |

PhD in | BUSINESS ADMINISTRATION AND MANAGEMENT |

Cycle | XXI |

Candidate's tutor | PROF. GIANMARIO VERONA |

Year of discussion | 2011 |

DECLARES

Under her responsibility:

- 1) that, according to the President's decree of 28.12.2000, No. 445, mendacious declarations, falsifying records and the use of false records are punishable under the penal code and special laws, should any of these hypotheses prove true, all benefits included in this declaration and those of the temporary embargo are automatically forfeited from the beginning;
- 2) that the University has the obligation, according to art. 6, par. 11, Ministerial Decree of 30th April 1999 protocol no. 224/1999, to keep copy of the thesis on deposit at the Biblioteche Nazionali Centrali di Roma e Firenze, where consultation is permitted, unless there is a temporary embargo in order to protect the rights of external bodies and industrial/commercial exploitation of the thesis;

- 3) that the Servizio Biblioteca Bocconi will file the thesis in its 'Archivio istituzionale ad accesso aperto' and will permit on-line consultation of the complete text (except in cases of a temporary embargo);
- 4) that in order keep the thesis on file at Biblioteca Bocconi, the University requires that the thesis be delivered by the candidate to Società NORMADEC (acting on behalf of the University) by online procedure the contents of which must be unalterable and that NORMADEC will indicate in each footnote the following information:
 - thesis: ***Knowledge, Innovation, and Social Norms in Creative Industries: Three Essays;***
 - by: ***Di Stefano Giada;***
 - discussed at Università Commerciale Luigi Bocconi – Milano in: ***2011;***
 - the thesis is protected by the regulations governing copyright (law of 22 April 1941, no. 633 and successive modifications). The exception is the right of Università Commerciale Luigi Bocconi to reproduce the same for research and teaching purposes, quoting the source;
 - **only in cases where another declaration has been undersigned requesting a temporary embargo:** the thesis is subject to a temporary embargo for (indicate duration of the embargo) months;
- 5) that the copy of the thesis deposited with NORMADEC by online procedure is identical to those handed in/sent to the Examiners and to any other copy deposited in the University offices on paper or electronic copy and, as a consequence, the University is absolved from any responsibility regarding errors, inaccuracy or omissions in the contents of the thesis;
- 6) that the contents and organization of the thesis is an original work carried out by the undersigned and does not in any way compromise the rights of third parties (law of 22 April 1941, no. 633 and successive integrations and modifications), including those regarding security of personal details; therefore the University is in any case absolved from any responsibility whatsoever, civil, administrative or penal and shall be exempt from any requests or claims from third parties;
- 7) that the PhD thesis is not the result of work included in the regulations governing industrial property, it was not produced as part of projects financed by public or private bodies with restrictions on the diffusion of the results; it is not subject to patent or protection registrations, and therefore not subject to an embargo;

Date January, 28, 2011

Signed (write name and surname) Giada Di Stefano

Alla mia famiglia

Table of Contents

Introduction.....	9
 Essay 1. Kitchen Confidential? Knowledge Transfer and Social Norms in Gourmet Cuisine	 13
1. Introduction	13
2. Theory and Hypotheses.....	16
2.1. The Role of Social Norms in Knowhow Transfer	18
2.2. The Role of IP Strategy in Knowhow Transfer	20
2.2.1. Competitive Positioning.	21
2.2.2. Information Characteristics.	22
2.2.3. Complementary Assets.	23
2.2.4. Potential for Gains from Ongoing Trade in Knowhow.	24
2.3. The Interaction between Theories of Information Transfer	25
3. Research Setting and Methodology.....	27
3.1. Experimental Design	27
3.2. Dependent, Independent and Control Variables.....	31
3.3. Analysis	35
4. Results.....	35
5. Discussion and Conclusion	39

Essay 2. Mysteries in the Air: Agglomeration, Social Norms, and Knowledge Transfer 53

1. Introduction	53
2. Theory and Hypotheses.....	56
3. Method	60
3.1. Empirical Design	61
3.1.1. Participants.	61
3.1.2. Procedure.	62
3.1.3. Experimental Design.	62
3.2. Variables.....	64
3.2.2. Independent Variables.	65
3.3. Econometric Approach.....	67
4. Results.....	68
5. Robustness Tests.....	69
6. Discussion and Conclusion	73

Essay 3. Live and Let Live? A Study of the Enforcement of Social Norms . 91

1. Introduction	91
2. Literature Review.....	93
3. Developing the Framework	95
3. 1. Information Sharing and Social Norms.....	97
3.2. Social Norms and Punishment: A Paradox	99
3.2.1. Attitudes toward Sanctioning.	100

3.2.2. Conditions for Sanctioning.....	101
3.3. The Emerging Framework.....	104
4. Testing the Framework.....	106
4.1. Sample.....	107
4.2. Procedure.....	108
4.3. Variables and Measures.....	109
4.3.1. Dependent Variable.....	109
4.3.2. Independent Variables.....	110
4.4. Model Specification.....	113
4.5. Opening the Black Box of Second-Party Sanctioning.....	114
4.5.1. Are sanctions likely to be administered?.....	114
4.5.2. When are sanctions more likely?.....	114
5. Discussion and Conclusion.....	115
Bibliography.....	131

Introduction

In 1983, Allen, Hyman, and Pinckney studied the source of significant innovation in 102 manufacturing companies. “The most surprising result”, they reported “is that so many of the firms supplying [innovative ideas] are apparent competitors. Nearly 23 percent of the messages were from firms in the same industry (Allen, Hyman, and Pinckney, 1983: 202).” Such knowledge transfer is not surprising when strong intellectual property rights (IPRs) exist (Appleyard, 1996; Gans and Stern, 2003). But without a central structure for administering and enforcing property rights, both invention and transfer of innovation should be suppressed (Gans, Hsu, and Stern, 2002). Recent studies have proposed, however, that decentralized institutional forms, such as norms, can support the creation, disclosure, and transfer of innovative ideas (e.g., Fauchart and von Hippel, 2008). According to these scholars, decentralized systems within networks, communities, or social groups can regulate the appropriate use of innovations.

My dissertation focuses on the role played by decentralized institutional forms, such as norms, in regulating the exchange of innovative ideas. In particular, I attempt to better understand when and how norms protect the transfer and use of innovation-related knowledge, with a specific focus on their interplay with strategic explanations for know-how trading, their functioning under specific competitive conditions, and the factors behind their emergence. Building on Ingram and Silverman (2002), I define norms as decentralized institutions, acting at the level of social groups and relying on social relationships for their enforcement. Norms are decentralized institutions, since their creation and enforcement does not depend on third parties and is instead carried out by each member of the social group in which the norms apply (Ingram and Silverman, 2002). In their widest possible connotation, social groups range from small communities (e.g., Ellickson, 1991; Greif, 1993; Clay, 1997; Richman, 2006) to the civil society as a whole (e.g., Gouldner, 1960; Cialdini

et al., 1997; Ames, Flynn and Weber, 2004; Batson et al., 2005). Finally, normative incentives can be either negative (i.e. costs imposed on those who fail to conform) or positive (i.e. benefits conferred to those who meet or exceed the normative requirement) (Rai, 1999).

Scholars have long been interested in social norms and how they govern interpersonal relationships. Sociologists, in particular, have noted the importance of these institutions in regulating human interaction. Political scientists like Elinor Ostrom have clarified how norms prevent overuse of common resources (Ostrom, 1990). Economists like Douglass North have shown how such institutions prevent socially destructive behavior (North, 1990). Recent contributions however have pointed at another role that social norms may play. According to these authors, social norms help protect transferred information from misuse (Raustiala and Sprigman, 2006; Fauchart and von Hippel, 2008), by giving rise to an informal intellectual property system that is alternative to a formal one based on legal mechanisms.

In the three essays of my dissertation, I target specific areas of inquiry regarding the role of norms in protecting the transfer and use of innovation-related knowledge. In the first essay of my dissertation, I investigate whether bilateral exchanges are facilitated either by the existence of norms that reduce the risk of misappropriation or by intellectual property strategies that decrease the potential for loss. Moreover, I try to disentangle the contingencies under which social norms and intellectual property strategies act as complements or substitutes. Results show that norms may play a role in governing the use of transferred knowhow, but that IP strategies also play an important role. Moreover, I show that norms substitute for some types of IP strategies but complement others.

In the second essay of my dissertation, I attempt to explain how competing firms located within geographical clusters prevent the loss of valuable but legally unprotected intellectual property. I propose that the density inherent in

agglomeration facilitates the maintenance of norms that restrict the misuse of transferred information. My results show that subjects in clusters expect potential competitors to adhere to social norms and are more willing to transfer knowledge. My analysis supports the idea that clustering reinforces adherence to social norms, thus promoting knowledge transfer across co-located firms.

Finally, in my third essay, I focus on the role of enforcement for holding social norms in place. Literature on social norms has consistently supported the idea that enforcement is a necessary condition for private institutions to succeed. Yet, when enforcement passes through sanctions, a free-riding issue is created. While offering a benefit that is shared by all members of the social group, sanctioning presents a cost that is born by the enforcer. Here I investigate when and why individuals are more likely to sanction norm violations. I focus on the case where sanctions are administered directly by the party that has been harmed by the deviation from the norm. I seek to understand what factors influence the party's propensity to sanction such an offense.

I study these issues in the context of gourmet cuisine, i.e. fine dining, which provides an excellent setting to conduct my research. It is an industry with rapid innovation (e.g., Rao, Monin, and Durand, 2003, 2005; Durand, Rao, and Monin, 2007), scarce protection of IP through legal mechanisms and documented functioning of a norm-based IP system (Fauchart and von Hippel, 2008). In analyzing this context, I rely on a mixed method approach, combining insights of interviews, the reach and relevance of a survey with the inference power of a randomized experiment. I collected my qualitative data through a field work, carried out in 2008 and 2009, and targeting top restaurants in Italy and the United States. I conducted detailed, recorded, in-person interviews with chefs from the eight top restaurants in the Milan area and four top restaurants in the Boston area. Later in 2009 and 2010, I also conducted shorter interviews with chefs from 11 additional restaurants in locations throughout Italy and the United States. I collected my quantitative data

through a scenario-based field experiment administered to Italian chefs at the beginning of 2009. This methodological approach allowed me to blend the rigor of experimental method with the richness and generalizability of field studies. In fact, by targeting real industry players, I was able to gather more realistic findings, despite losing some of the cleanliness of laboratory experiments.

I believe my research has the potential to make a valuable contribution. A better understanding of how information flows when it cannot be legally protected is critical to both theory and practice. Convincing evidence that norms protect innovation from misappropriation could help explain why some industries such as fashion, gourmet cuisine, and music maintain high levels of innovation despite operating in weak appropriability regimes. Most of all, I provide a more complete validation and an extension of the role played by social norms in protecting intellectual property. Firms are more willing to trade know-how if they expect their counterparts to use it properly. In the first essay, I show that this holds even if firms have access to intellectual property strategies. In the second essays, I show that social norms are fundamental also for neighboring competitors. I also show that the perception of norms is influenced by the dyadic characteristics of exchange partners. Results of my fixed-effects analyses show that the same subject changes his expectations of normative behavior depending on the characteristics of the counterpart with whom he is interacting. That is, normative expectations are not just a fixed individual attribute; they are selectively applied based on the characteristics of others. This evidence poses the intriguing question of what ultimately explains the expectation of appropriate behavior.

In future research, I plan to continue to explore the interplay of decentralized and centralized institutions, their influence on expectations of behavior, and their role in regulating innovation and information transfer.

Essay 1.

Kitchen Confidential? Knowledge Transfer and Social Norms in Gourmet Cuisine¹

In this paper, we explore the conditions for knowhow transfer in gourmet cuisine, an industry characterized by rapid innovation and weak protection of intellectual property (IP). We investigate whether bilateral exchanges are facilitated either by the existence of norms that reduce the risk of misappropriation or by IP strategies that decrease the potential for loss. Moreover, we disentangle how these different mechanisms interact. Using evidence from a scenario-based field experiment, we demonstrate that norms play a role in governing the use of transferred information, but that IP strategies also play an important role. We show that norms substitute for some types of IP strategies but complement others.

1. Introduction

Understanding how ideas flow within industries is critical to both theory and practice. Scholars have studied the flow of knowhow most extensively by tracing the transfer and use of protected intellectual property (e.g. use of patents or copyrights).² But intellectual property rights (IPRs) are not available or effective in many industries and for many innovations (Cohen, Nelson, and Walsh, 2000). Better understanding of how information flows when it cannot be legally protected could influence scholarly

¹The essay is co-authored with Andrew A. King (Dartmouth College) and Gianmario Verona (Bocconi University). The authors acknowledge financial support from the Research Division "Claudio Dematté" of SDA Bocconi School of Management, Bocconi University and the Tuck School of Business at Dartmouth. The authors wish to thank Emmanuelle Fauchart, Jennifer Jordan, Karim Lakhani, Margaret Peteraf, Giovanni Valentini, David Waguespack, as well as participants to the NBER Productivity Lunch Seminar Series, the 2010 Open and User Innovation Workshop, and seminars at Bocconi University, ESSEC, IESE, INSEAD, London Business School, Tuck School of Business, and Harvard Business School, for their insightful comments.

² Von Hippel (1987: 291) defines knowhow as "the accumulated practical skill or expertise which allows one to do something smoothly and efficiently [...] develop its products and develop and operate its processes. Often, a firm considers a significant portion of such knowhow proprietary and protects it as a trade secret." For expository simplicity, we use knowhow interchangeably with knowledge, information, and ideas.

analysis of competition, firm strategy, and the formation of industry clusters (Gans, Hsu, and Stern, 2008). In this article, we explore the transfer of creative ideas in one industry with weak intellectual property rights: gourmet cuisine. To facilitate our exploration, we use an empirical design that combines the reach and relevance of a survey with the inference power of a randomized experiment.

Many studies have noted that competitors often trade knowhow, and that the flow of such information can represent a large fraction of the valuable information received (Allen, Hyman, and Pinckney, 1983). Such knowledge transfer is not surprising when strong legal intellectual property (IP) protection prevents misuse of such information (Gans and Stern, 2003). When legal property rights are weak, however, scholars predict that knowledge sharing will be rare (Appleyard, 1996). Yet surprisingly, some empirical studies show that even when valuable ideas cannot be protected through legal means, possessors of these ideas often disclose and transfer them to possible competitors (Fauchart and von Hippel, 2008; Raustiala and Sprigman, 2006).

What explains transfer of unprotected information? One recent suggestion is that informal institutional structures (e.g. norms) substitute for missing regulatory institutions (e.g. patent laws) to prevent the misuse of another's ideas. Scholars suggest that industry players develop norms of behavior, which in turn help them to protect transferred information from misuse (c.f. Fauchart and von Hippel, 2008). Norms, they argue, are held in place by actors who observe and sanction misbehavior. While these proposals are intriguing, many questions about the role of norms remain. In particular, norm-based explanations have so-far ignored the possibility that firms could use classic intellectual property (IP) strategies to prevent misuse of information. For example, firms could choose to transfer information only to those unlikely to compete more directly. Or they could leverage isolating mechanisms to prevent others from using valuable knowhow (Rumelt, 1984), as in the case of complementary assets (c.f. Teece, 1986). Before strong inferences about

the role of norms can be reached, their influence must be evaluated under varying degrees of competition and differing access to alternative protection mechanisms.

In this article, we investigate the extent to which norms or IP strategies explain the transfer of knowhow among restaurants. Gourmet cuisine is an excellent setting to conduct our research. It is an industry with rapid innovation (Durand, Rao, and Monin, 2007; Rao, Monin, and Durand, 2003, 2005). It is also an industry in which normative protection of knowledge transfer has been documented (Fauchart and von Hippel, 2008). In high-end cuisine, knowhow in the form of recipes or techniques usually cannot be protected by patents, copyrights, or even legally protected trade secrets. Chefs in the industry can share their knowledge in public through conferences or publications, or share it in private through one-to-one personal interactions. The latter type of information transfer is the one that interests us, since it allows us to explore the conditions under which firms will voluntarily release sensitive information to potential competitors. Our results show that norms may play a role in governing the use of transferred information, but that IP strategies also play an important role. We show that norms substitute for some types of IP strategies but complement others.

Our research extends the existing literature on knowhow trading between competitors (Appleyard, 1996; Carter, 1989; Gans and Stern, 2003; von Hippel, 1987) and it provides more detail about the conditions that support knowledge spillovers (Almeida and Kogut, 1999; Klepper, 2010; Singh, 2005; Zucker, Darby, and Armstrong, 1998). It also provides a partial response to recent calls for more research on how informal connections among people affect the knowledge management process (Argote, McEvily, and Reagans, 2003).

The paper is organized as follows. The next section reviews the literature on knowhow transfer and then develops the hypotheses on which our study is based. The following section details the method and data we employ to test our theory. Finally, we present results and conclude with a brief discussion.

2. Theory and Hypotheses

In 1983, Allen, Hyman, and Pinckney studied the source of significant innovation in 102 manufacturing companies. “The most surprising result”, they reported “is that so many of the firms supplying [innovative ideas] are apparent competitors. Nearly 23 percent of the messages were from firms in the same industry.” (Allen *et al.*, 1983: 202) This unexpected trade has since been documented in several contexts and industries.³ With the rise of the knowledge economy and the increasing importance of proprietary information, understanding the causes of and conditions for such transfer has become more important.

Previous research provides two broad streams of explanation for the transfer of information among competing firms (e.g., Davies and Kline, 2005; Fauchart and von Hippel, 2008; Teece, 1986). The first stream argues that norms substitute for missing legal property protection in preventing misuse of transferred information. The second argues that actors transfer information conditional on the competitive circumstances which make the damage from misuse greater or smaller.

The first stream of logic draws on principles from institutional theory to argue that social norms may play an important role in preventing competitors from misappropriating transferred information – even if it is in their economic interest to do so. Following this line of reasoning, scholars propose that social norms can protect ideas from misappropriation when they are not protected by legal rights (Fauchart and von Hippel, 2008). Such norms, the theory suggests, use distributed mechanisms of enforcement to punish anti-normative behavior. Some of these penalties operate within the group, but “the ultimate penalty for violating a norm is the cessation of a relationship, or in the extreme, ostracism from a group.” (Ingram and Silverman, 2002: 14).

³ The importance of such trade has increased because innovation was once thought to occur predominantly inside of firms. More recently Chesbrough (2003) has argued that innovation is more commonly occurring in an “open” and “distributed” manner. As a result, scholars have become more interested in the decentralized mechanisms that support or impede such distributed innovation.

The idea that norms could protect innovation from misappropriation could help explain why some industries such as fashion, gourmet cuisine, and music have high levels of design effort and innovation investment while operating in relatively weak property right regimes. For theory, normative protection of intellectual property would also provide more evidence of the power of decentralized institutions and their ability to complement or even substitute for more centralized institutions, such as laws and rules (Feldman and Harel, 2008; Zasu, 2007). The potential power of decentralized institutions is a central topic in modern institutional research (Prakash and Potoski, 2006) and social sciences in general. This importance was recently highlighted by the selection of Elinor Ostrom as the 2009 Nobel Prize Laureate in Economic Sciences for her research on decentralized governance of common-property problems.

A second stream of logic draws on theories of competitive strategy and suggests that firms transfer proprietary information when competitors will not gain a relative advantage from this information. There are two main currents of logic within this stream. The first current suggests that the transfer of innovative ideas is facilitated when competitors *cannot* benefit from their use. Potential competitors may be unable to copy transferred innovations because of the path dependency of competitive positioning. Alternatively, competitors may not be able to expropriate any return from the transferred information because isolating mechanisms prevent the use of the information. These barriers could arise from the information itself, its tacit or fragmented nature, or from complementary assets controlled by the firm which was the source of the information (Teece, 1986). A second current emphasizes the role of expectation of ongoing gains from trade in motivating information transfer. Even if competitors have the ability to use transferred information and the incentive to do so, the potential for ongoing gains from repeated exchange may encourage both parties to behave appropriately (Baker, Gibbons, and Murphy, 2002; Ingram and Inman, 1996; Ingram and Roberts, 2000).

In summary, one explanation for the transfer of unprotected information among competitors suggests that receivers of information have an incentive to misappropriate ideas, but do not do so because a community-level institution prevents their misuse. A second explanation suggests that firms will pass innovative ideas when receivers lack appropriate market positioning, sufficient information or complementary assets. To fully understand either theory, they must be evaluated together. Moreover, analysis of their interaction would clarify their functioning and relative importance.

2.1. The Role of Social Norms in Knowhow Transfer

Scholars have long been interested in the role that social norms play in governing interpersonal relationships. Sociologists, in particular, have noted the importance of these institutions in regulating human interaction, but scholars from other disciplines have actively explored the nature of norms as well. Political scientists like Elinor Ostrom have shown that norms can play an important role in preventing overuse of common resources (Ostrom, 1990). Economists like Douglass North have shown how such “informal” and “decentralized” institutions prevent socially destructive behavior (North, 1990).

Norms are decentralized institutions, acting at the level of the social group and relying on social relationships for their enforcement (Ingram and Silverman, 2002). They are defined as decentralized institutions since their creation and enforcement does not depend on third parties and is instead carried out by each member of the social group for which the norms apply (Ingram and Silverman, 2002). Norms act throughout civil society, and their application ranges from long-distance traders (Clay, 1997; Greif, 1993), to cattlemen (Ellickson, 1991), to diamond merchants (Richman, 2006). Norms rely on social relationships for their enforcement, with normative incentives being either negative (i.e. costs imposed on those who fail to conform) or positive (i.e. benefits conferred to those who meet or exceed the

normative requirement) (Rai, 1999). Although norms rely on decentralized enforcement, norms may also interact and draw strength from more centralized institutional forms. For example, if social punishments (such as shaming, loss of prestige, and so on) fail, actors may seek recourse from more centralized institutions. In fact, it is the complex interaction between the two types of institutions that often governs human behavior (e.g., Feldman and Harel, 2008; Zasu, 2007).

Fauchart and von Hippel (2008) argue that norms allow the gourmet cuisine industry to retain high levels of creativity and innovation even though legal protection of property rights is lacking. Recipes cannot be protected by patents or copyrights, since, as one accomplished chef remarked during an interview, “how could you pay copyrights if you can just misplace a leaf on the plate and copyright would not be infringed anymore?” Because legal protection of trade secrets has proven ineffective, some scholars argue that chefs have turned to social norms as substitutes for formal intellectual property rights (Fauchart and von Hippel, 2008). They claim that in French cuisine a strong norm-based IP system protects recipe and processing innovations from copying. According to Fauchart and von Hippel (2008), the exchange of information in the culinary industry is regulated by three basic social norms, according to which when a chef receives recipe-related information from another chef, he: (1) must not copy the recipe exactly; (2) must credit the author of the recipe if he is going to significantly rely on it in the development of a dish; and (3) must not pass the recipe-related information to a third party without asking for permission of the author. These norms, Fauchart and von Hippel (2008) argue, are held in place by a system for punishing deviations. If a chef deviates from the norms, he will be sanctioned with negative gossiping within the community and decreased likelihood that his additional requests for information will be answered by community members.

Although Fauchart and von Hippel (2008) provide evidence that the chefs share a belief that such norms should be followed and deviations should be

punished, they only demonstrate the efficacy of these norms by showing that chefs are more willing to transfer information if told that the receiving party will not misuse it. While this is intriguing evidence, it does not demonstrate that a sustainable norm system is actually in place. Indeed, Fauchart and von Hippel did not show that normative behavior was more expected or more likely when adherence to norms could be observed or enforced. As a first step of our analysis, we provide a more complete test of their theory. We predict that knowhow transfer is more likely when normative behavior is expected. We also hypothesize that conditions for effective functioning of norms will lead to greater knowhow transfer.

H1: The higher: (a) the expectation of adherence to social norms; (b) the visibility of non-adherence to social norms; (c) the possibility to directly sanction non-adherence to social norms, the higher the likelihood of knowhow transfer.

2.2. The Role of IP Strategy in Knowhow Transfer

Fauchart and von Hippel's (2008) research on the role of norms in knowhow transfer represents a provocative challenge to an older literature on ways that valuable information may be protected without support from controlling institutions (Teece, 1986). This literature suggests that a firm's competitive position and its use of isolating mechanisms may prevent others from using its information to competitive advantage. A complete test of the role of norms, must demonstrate that it is normative control – and not these strategic mechanisms – that facilitate knowhow transfer. Institutions, including norms, only bind human behavior if they prevent actions that would otherwise occur. In the case of knowhow transfer, this means that norms prevent the receiving party from using the information in some way.

We first consider whether or not differing geographic and market positions could influence knowhow transfer. We then consider whether or not the nature of the information itself – its completeness or ephemeral nature – could influence which

information managers choose to transfer. After that, we discuss whether complementary assets might influence the propensity for firms to share information. As a last step, we consider whether or not potential gains from trade could provide a barrier to inappropriate use of transferred knowhow.

2.2.1. Competitive Positioning. For transferred knowhow to harm the firm from which it originates, it must help competitors to be more effective or allow them to move into more direct competition. For example, information might allow potential competitors to lower their production costs or to change their products so that they overlap more with those of the focal firm. Reductions in production costs will have a bigger effect when firms have similarly positioned products (Kreps, 1990). Similar product or geographic positioning will exacerbate the incentive to engage in price competition, and a production cost advantage will increase a potential competitor's ability (Kreps, 1990). Thus knowhow transfer that reduces production costs should have a bigger effect on competition when the receiving party is more similar.

More similar competitive positioning can also exacerbate the degree to which a potential competitor can use transferred information. Scholars have long noted that related experience increases the "absorptive capacity" of the firm, thereby making it easier for them to recognize, understand, and implement information related to existing activities (Cohen and Levinthal, 1990; Zahra and George, 2002). Thus, knowhow transferred to more similar competitors should be more easily absorbed and thus have a larger effect on their processes.

Finally, similarity of the potential competitor may also influence their *propensity* to compete more aggressively with another firm. Firms make investments in localized assets or in particular skills which may then constrain their ability to change their position in the future. For example, once a restaurant has invested in a physical location or internal equipment it cannot easily change to a new location or cuisine. For this reason, stores like Benihana which are designed around one type of cooking (hibachi table grilling) cannot easily adopt the techniques which do not use

these resources. Similarly, a firm that has chosen a location from which to serve a particular set of clients cannot easily move to another location. Assets in name recognition, referrals, and supply networks all have a strong geographic component (Buenstorf and Klepper, 2009; Klepper and Simons, 2000).

For our analysis, these arguments suggests that transferring knowhow to firms with more similar products and competing in similar geographical areas could more seriously harm the competitive position of the source of that knowhow. Based on this argument, firms that are acting strategically should be less willing to transfer knowledge to more similarly positioned competitors.

H2: The more similar the competitive positioning of two firms, the lower the likelihood of knowhow transfer.

2.2.2. Information Characteristics. Not all information transfers equally well (Szulanski, 1996). Indeed, the nature of the information itself can provide a type of isolating mechanism that prevents its use by potential competitors. Knowledge that is tacit, complex, or incomplete is particularly hard to use (Barney, 1991; Dierickx and Cool, 1989; Lippman and Rumelt, 1982; Peteraf, 1993; Reed and DeFillippi, 1990). For this reason, von Hippel (1994) argues that certain types of information are “sticky” and hard to transfer.

Information characteristics can be used strategically as isolating mechanisms. For example, firms can decide to pass information in fragmented form. Zhao (2006) suggests that the ability to break important ideas into fragments enables multinational firms to conduct R&D in countries with weak intellectual property rights. Imitation of each fragment is prevented because each relies on another non-transferred fragment and only the complete puzzle provides value. Empirical evidence suggests that firms strategically use such a fragmentation strategy to protect critical information (Feinberg and Gupta, 2009; Zhao, 2006). In our case, firms exchanging knowhow could choose to transfer only part of the information needed for a complete product or process recipe.

H3a: The more incomplete the information, the higher the likelihood of knowhow transfer.

The pace of information obsolescence can also provide a barrier to copying. For example, in semiconductor fabrication, IBM has chosen to share its intellectual property with competitors to support R&D on next generation semiconductor fabrication technology. IBM can do this because any piece of information has a very short useful life (Shih, Pisano and King, 2008). This natural obsolescence reduces the cost of information loss (Shih, Pisano and King, 2008). The barriers caused by such rapid change are related to the “time compression diseconomies” identified by Dierickx and Cool (1989). They argue that firms may not be able to catch up to a leading firm in an industry because the rate of adoption and implementation of new capabilities cannot be accelerated sufficiently. Thus the potential risk of competition from information transfer is lower when products or processes change rapidly. It is indeed reasonable to expect that when the pace of innovation is very high, the value of the transferred knowhow, as well as the cost in which the firm will incur in case of expropriation, will be lower.

H3b: The more ephemeral the information, the higher the likelihood of knowhow transfer.

2.2.3. Complementary Assets. Another type of isolating mechanism that firms can use is constituted by the barriers to imitation created by complementary assets (Teece, 1986). The ability to profit from an innovation is dependent on the firm’s other assets such as manufacturing, distribution, service and complementary technologies.

Complementary assets are most important in weak appropriability regimes, where imitation is relatively easy (Pisano, 2006). Gans and Stern (2003) also note that complementary assets are critical enablers of information transfer. Firms with complementary assets are more willing to exchange weakly protected knowhow,

while those without them are more likely to fear misappropriation. As a consequence, firms possessing complementary assets should be more willing to transfer knowhow.

H4: Ownership of complementary assets increases the likelihood of knowhow transfer.

2.2.4. Potential for Gains from Ongoing Trade in Knowhow. Studies of information transfer among competitors have previously noted that transfer is often reciprocal. A party asking for information at one point in time may be asked for information in the next. Ongoing reciprocity of exchange could help to create a kind of relational contract in which one transfer is expected to lead to the next and so on (Baker *et al.*, 2002). Such relational contracts are held in place by the “shadow of the future” – the value of ongoing exchanges. When parties cooperate they gain these benefits, when one defects they lose them. A system of tit-for-tat enforcement can then encourage beneficial exchange. Gibbons (2001; 2005) argues that such ongoing exchanges are important elements of many types of contracts. But not everyone partakes in such exchanges. Who is likely to participate?

Since a “relational contract” is held in place by both sides valuing the exchange and fearing to lose it, the sender and receiver must be able to benefit from each other’s knowhow (Gibbons, 2001; 2005). Similar technological trajectories or similar production philosophies increase the chance that two parties can benefit from exchange of information. An extreme form of this occurs in the development of semiconductors. Companies pursuing one line of development (e.g. “high k-metal gate insulators”) can more easily share information than those pursuing other approaches.⁴ For example, software based around similar platforms (such as Linux or BSD Unix) can more easily exchange knowhow (Lee and Cole, 2003). As a result, competing firms engaged in similar approaches sometimes form associations to facilitate the ongoing exchange of knowhow.⁵ In summary, similarity of technological

⁴ See <http://www.nanowerk.com/news/newsid=5283.php>. Last access: 30 July 2010.

⁵ See <http://www-03.ibm.com/press/us/en/pressrelease/27222.wss>. Last access: 30 July 2010.

approach leads to the potential for gains from exchange, thereby encouraging knowhow transfer.⁶

H5: The higher the potential for gains from trade, the higher the likelihood of knowhow transfer.

2.3. The Interaction between Theories of Information Transfer

All of the above hypotheses try to tease out the explanatory power of two theories of information transfer, stressing the role that social norms as well as IP strategy have in favoring the likelihood of passing information to other firms in the industry. We turn now to how these mechanisms may interact with each other.

In most cases, logic would suggest that control of information use by normative constraint or by IP strategy should act as substitutes. Considering the extreme cases makes this clear: if, for instance, isolating mechanisms prevent the use of transferred information, norms are not needed. If normative control is perfect, isolating mechanisms are not useful. Gans and Stern (2003) make a similar argument in their analysis of the potential for inventors to reveal their ideas to potential buyers. When protection of the idea is provided by legal rights or by complementary assets, inventors can reveal their ideas, but when this is not the case inventors are only likely to reveal their ideas to those who have a “reputation” for fair dealing.

Following this argument, we expect to observe that social norms will have less influence on behavior when other protection mechanisms are in place. For example, the lower the likelihood of competition, the less knowhow transfer will depend on protection from social norms. Norms should also substitute for the strategic revelation of information. If firms decide to pass information whose value is more ephemeral or whose misappropriation has a potential for damage, they should need less the protection from social norms. Finally, returning to the logic introduced by

⁶ Obviously, greater similarity in technology could also lead to greater competition. We discuss this issue in the next section.

Gans and Stern (2003), social norms should also substitute for complementary assets. Since complementary assets act as barriers to imitation, firms possessing these assets should not need the protection from social norms. They can rely instead on the protection offered by their ability to appropriate the returns from innovation by means of those assets required for the successful commercialization of an innovation.

H6: Expectation of adherence to social norms has a smaller effect on knowhow transfer when: (a) firms are less similarly positioned; (b) information is more incomplete or ephemeral; (c) firms possess complementary assets.

With respect to the expectation of gains from trade of knowhow, the logic of substitution no longer holds. This is because the conditions that allow gains from trade may also increase competition. Firms that can benefit from the information of another are more likely to have related products and processes. Unless these are separated geographically, transfer of knowhow could increase their competition. Thus, firms with similar approaches can gain if they cooperate or harm each other if they defect. What can get them started on the cooperative path? Research suggests that normative expectations and reputation can be a critical first step (Lai *et al.*, 2003). This can encourage the two parties to begin and sustain cooperation (Axelrod, 1984). Ostrom (2003) argues that norms can reinforce the potential for reciprocity to take hold and for cooperation to be maintained. Indeed, consistent with the findings from evolutionary game theory and psychology, she argues that people tend to cooperate with those individuals who they expect to reciprocate. This expectation is based on visual and verbal cues used to determine who will follow norms. Given the tension between competition and cooperation that similarity creates, expectation of appropriate behavior is even more important in setting the stage for cooperation or defection.

H7: Expectation of adherence to social norms has a larger effect on knowhow transfer when potential for gains from trade increases.

3. Research Setting and Methodology

In the above sections, we have developed a theory of knowhow transfer based on the insights of the existing literature, and in particular on two perspectives stressing the role that social norms and IP strategy may have in explaining how to prevent the loss of valuable knowhow and hence to facilitate its transfer.

In order to test our hypotheses, we conducted a scenario-based experiment (Florey and Harrison, 2000; Gomez, Kirkman, and Shapiro, 2000), that we administered through a survey targeting an extensive sample of Italian chefs. We chose to study knowhow transfer among chefs, because gourmet cuisine is an industry with rapid innovation (Durand *et al.*, 2007; Rao *et al.*, 2003, 2005), where normative protection of knowledge transfer has been documented (Fauchart and von Hippel, 2008), and legal protection of knowhow is not feasible.

In our scenarios, we describe a restaurant with which the surveyed chef might interact. The characteristics of this target restaurant constitute our experimental manipulations. After evaluating the experimental scenario, we asked our participants several questions that measured our dependent variable. Figure 1 shows a sample scenario.

-Insert Figure 1 about here-

3.1. Experimental Design

We administered our experiment to the chefs of all the restaurants included in the 2009 Italian edition of the Michelin Guide. The Michelin Guide is the main reference point in high-end cuisine for both chefs and industry experts (Ferguson, 1998; Karpik, 2000). It has been used as a basis for many studies grounded in gourmet cuisine during the last years (e.g., Durand *et al.*, 2007; Fauchart and von Hippel,

2008; Rao *et al.*, 2003, 2005). Michelin evaluates restaurants on a 5-point scale, where each point of the scale corresponds to a “fork”. Ratings may hence go from 1 fork (i.e. “quite comfortable décor, ambience and service”) to 5 forks (“luxurious décor, ambience and service”). When the forks attributed to restaurants are colored in red, the restaurants are “particularly pleasant or restful establishments: the character of the building, its décor, the setting, the welcome and services offered may all contribute to this special appeal”. On top of forks, restaurants offering a particularly good cuisine are also awarded stars, ranging from one star (i.e. “a very good restaurant in its category”) to three stars (i.e. “exceptional cuisine, worth a special journey”). Obtaining a Michelin star is one of the top achievements that a chef can achieve, signaling quality and creativity. Limiting our analysis to establishments included in the Michelin Guide guarantees a heterogeneous sample of restaurants across the dimensions of food, décor, ambience, and price, while ensuring a minimum quality standard.

3.1.1. Participants. The 2009 edition of the Michelin Guide for Italy included a total of 2,529 restaurants, 275 of which have received stars (respectively 236, 34, and 5 restaurants for each category from one to three stars). Of the surveys we distributed, 534 chefs responded (21.1%) with 492 completed surveys (19.5%). Our respondents are mainly male (82%) and have an age ranging from 23 to 80 years (mean=46). Moreover, 92 respondents worked for starred restaurants (respectively 74, 16, and 2 respondents for each category from one to three stars). Characteristics of the population of interest and of the respondents are presented in Table 1.

-Insert Table 1 about here-

Compared to the average restaurant on the Michelin guide, restaurants in our sample are significantly more expensive (48.52 vs. 44.60 Euros; $t(2,527)=-5.87$, $p=0.00$, $d=0.29$), as well as better rated in terms of forks (1.95 vs. 1.81 forks; $t(2,527)=-5.36$, $p=0.00$, $d=0.26$) and stars (0.22 vs. 0.12 stars; $t(2,527)=-6.95$,

$p=0.00$, $d=0.38$).⁷ However, there is no significant difference in location between respondents and non-respondents. Overall, restaurants in our sample tend to be significantly better in terms of quality point (forks, stars, and average price), even if the size of the effect is quite small. This implies that the results of our analysis may be more representative of higher end restaurants, with the generality of our findings not being extendable to the lower end ones. This sample difference may increase our potential to see the effect of social norms, which often apply disproportionately to elite social groups. Indeed when looking for evidence of the role of norms, Fauchart and von Hippel (2008) limited their analysis to French restaurants that gained at least two Michelin forks. This is also consistent with findings contradicting knowledge transfer across chain restaurants (Darr, Argote and Eppler, 1995).

3.1.2. Study Design. Following methodological recommendations, we developed the scenarios through direct interaction with a selected set of informants. These informants comprised eight Michelin-starred chefs working in Milan. During the interviews, after a set of questions about their training and cuisine style, we asked these chefs about knowhow transfer, social norms and relationships with colleagues and intermediaries. These interviews were fundamental to better understand the constructs of interest and their measurement within the industry. We interviewed four of our informants a second time for the purpose of providing face validity to the instrument that we used for testing our hypotheses. Finally, we pre-tested the instrument on a sample of 224 restaurants that were not part of the final sample.

In the scenario, we manipulated four variables. Our experimental design is a 2 (geographical proximity) x 2 (product positioning) x 2 (status) x 2 (frequency of review). We rely on a mixed design (i.e., both within- and between-subject assignment), since each respondent was randomly assigned two different scenarios

⁷ Given the large size of the sample, we also report effect sizes, measured with Cohen's d . The values are inferior to 0.5 in all the three cases, showing that the differences between respondents and non-respondents, despite significant, are relatively small.

(out of the sixteen alternatives). Table 2 presents a detailed description of the manipulated variables and the manipulations.

-Insert Table 2 about here-

Geographical proximity was manipulated by describing the restaurant as “physically very close to your restaurant” vs. “physically very distant from your restaurant”. On the advice of chefs in the industry, we avoided inserting reference points (such as 5 miles away or within the same block) to avoid differences caused by modes of transport. We did not perform a manipulation check for this variable, since our treatment is a concrete statement of fact (Perdue and Summers, 1986).

Product positioning was manipulated by describing the restaurant as “cuisine style and ambience similar to your restaurant” vs. “cuisine style and ambience very different from your restaurant”. We checked the success of the manipulation of product positioning by asking the respondent to evaluate, on a 7-point likert scale, to what extent the restaurant described in the scenario was comparable in terms of positioning ($F(1,1063)=8.43$, $p=0.00$).

Status was manipulated by describing the restaurant as “Zagalin cuisine rating 28. Comments: creative, innovative, unique style. Chef has 20 years of experience in the industry” vs. “Zagalin cuisine rating 20. Comments: lacks imagination, unoriginal, ordinary style. Chef has 1 year of experience in the industry”. Zagalin is a fantasy name, and we explained the rating as being equivalent to a ZagatTM rating, ranging from 0 to 30. We checked the success of the manipulation by asking to evaluate, on a 7-point likert scale, to what extent the chef described in the scenario was considered highly prestigious by colleagues ($F(1,1060)=9.07$, $p=0.00$).

Finally, frequency of review was manipulated by describing the restaurant as “frequently reviewed by local media and customers (among the restaurants with more reviews)” vs. “rarely reviewed by local media and customers (among the restaurants with fewer reviews)”. We avoided inserting any reference point (such as among the 5% top reviewed restaurant) so to avoid any subjectivity in the

interpretation of the manipulation. As above, we did not perform any manipulation check for this variable, since our treatment is a concrete statement of fact (Perdue and Summers, 1986).

3.1.3. Procedure. We send each of the restaurants in our sample a survey, addressed to the restaurant's head chef. In the cover letter, we gave the respondents the option to either complete the survey using the enclosed hard-copy form, or online using a link specified in the letter. In the survey, the chef was asked to provide some information regarding herself and her restaurant and then to answer a series of questions regarding her likelihood of transferring information to the chef of the restaurant described in the scenario. Each respondent was randomly assigned two scenarios out of sixteen possible alternatives, and asked to answer a set of questions about knowledge transfer. The scenarios were used to manipulate our focal variables.⁸

3.2. Dependent, Independent and Control Variables

Our dependent variable, *knowhow transfer*, is the likelihood that the respondent would provide information to the chef described in the scenario, measured with a 7-point likert scale. In particular, we measured three types of information that could be shared, i.e. recipes, recipes of signature dishes, and cooking techniques.⁹

Hypothesis 1 postulates the positive effect of social norms on knowhow transfer, distinguishing among expectation of adherence to social norms (H1a), visibility of non-adherence to social norms (H1b) and possibility to sanction directly non-adherence to social norms (H1c). We operationalized these three variables

⁸ Note that 94% of respondents returned two scenarios, whereas the remaining 6% returned from one to six scenarios (having completed the survey both offline and online), for a total of 1,010 scenarios.

⁹ A signature dish is a dish that uniquely identifies a chef, and is commonly associated to his cuisine. Despite the menu can be changed frequently, these dishes are always present, as they represent the artistry, style and approach to cuisine of their inventors.

following Fauchart and von Hippel (2008). Expectation of adherence to social norms (*appropriate behavior*) is measured as the average of three items, namely the likelihood that, if the chef described in the scenario received recipe-related information from our respondent, (s)he: would have not copied the recipe exactly; would have credited the author of the recipe; and would have not passed the information to a third party without asking for permission. Results do not change if the three items are entered into our model separately. We operationalized visibility of non-adherence to social norms (*sanctionability*) as the average of two items, namely the likelihood that in case of deviations from expected behavior, the deviant behavior could be noticed by: other chefs; and third parties, such as media or customers. Results do not vary if the two items are entered in our model separately. Finally, possibility to sanction directly non-adherence to social norms (*punishment*) is measured as the average of three items, namely the likelihood that, in case of deviations from expected behavior, the chef who provided the information: would engage in negative gossiping within the community; would not return any future request for help; and would not return any future request for information. Results do not vary if the three items are entered separately.

Hypothesis 2 postulates the negative effect of similarity of competitive positioning on knowhow transfer. In order to test this hypothesis, we relied on insights from our interviews. Respondents were universal in stating that the two most important determinants of competition were physical proximity and similarity of cuisine and ambience. This is consistent with previous accounts from the hospitality industry (Baum and Mezias, 1992). As a consequence, we manipulated *geographical proximity* and *product positioning* in the scenario. Then, we created a single measure that we call *similarity of positioning*, that is the simple sum of the two variables. We present the (consistent) results for the case in which the two manipulations are not aggregated in Appendix A.

Hypothesis 3 postulates the positive effect of incomplete (H3a) and ephemeral information (H3b) on knowhow transfer. Managers exchanging knowhow could choose to transfer only part of the information needed for a complete product or process recipe. We capture this effect by looking at the difference between transfer of techniques and transfer of entire recipes. To this end, we marked the three different types of transfer with dummy variables and combined the three reports of willingness to transfer (recipes, signature dishes, techniques) into one database. By construction, this raises the number of observation approximately threefold. The dummy variable *techniques* equals 1 in case of transfer of techniques and 0 otherwise.

Information is ephemeral when the pace of its obsolescence is rapid. We measure the ephemeral nature of information by looking at the relevance that innovation has for our respondents. To this end, we asked them to rate how important menu changes are for their customers (*importance of change*), on a 7-point likert scale ranging from "not important at all" to "extremely important".

Hypothesis 4 postulates the positive effect of complementary assets on knowhow transfer. We measure complementary assets in two ways. First, we look at upstream complementary assets, i.e. assets related to the production process. According to our informants, upstream complementary assets in gourmet cuisine are the unique inputs that chefs can rely on when preparing their recipes. In particular, our respondents testified to the importance of unique suppliers, describing them as one of the best-kept secrets in professional kitchens. In order to get the information about the presence of these assets, we hence asked our respondents about their reliance on unique suppliers (*unique suppliers*), measured with a dummy variable. Second, we look at downstream complementary assets, i.e. assets related to the commercialization of the product. We measured downstream complementary assets by using the color of the forks awarded by Michelin. Forks are colored in red when restaurants provide "particularly pleasant or restful establishments" as a result of

"the character of the building, its décor, the setting, the welcome and services offered [...]". These truly unique restaurants benefit from special locations (e.g., the ancient palace in the heart of Florence), peculiar settings (e.g. a mountain chalet on the Dolomites), or spectacular positions (e.g., the top of a sea cliff in Capri). Red coloring of forks should capture complementary assets only a few restaurants can count on. Our dummy *color* equals 1 for "red-forked" restaurants and 0 otherwise.

Hypothesis 5 postulates the positive effect of potential for gains from trade on knowhow transfer. According to our informants, we can observe a potential gain from trade in gourmet cuisine in the case of chefs sharing the same "approach to cuisine". Chefs in our interviews frequently discussed the issue of the approach to cuisine. In the words of one of our informants: "The exchange depends on the fact that they have an approach to cuisine that is similar to mine. This also influences the exchange of opinions that we have". Analogously: "It is a matter of affinity: we all look for similar persons, and to me it is very important to dedicate a lot of time to this search, to this selection of friends or colleagues who allow me to grow and evolve." Based on the insights from our field research, we measured potential for gains from trade looking at the similarity in approaches to cuisine between our respondent and the chef described in the scenario, measured on a 7-point likert scale (*similarity of approach*).

Finally, we included a series of respondent-related controls in our analyses, namely: position of the respondent in the organization (*owner*); gender of the respondent (*male*); belongingness of the restaurant to a chain (*chain*); years of experience in the industry of the respondent (*experience*); and finally the fact that the respondent has been granted or not a Michelin star (*Michelin star*). *Status* and *frequency of review*, which we manipulated in the scenario, were used as controls. A comprehensive list of the variables, together with their measures and operationalization, is shown in Table 3. Descriptive statistics and correlations among all the variables described above and entered into our model are shown in Table 4.

-Insert Tables 3 and 4 about here-

3.3. Analysis

We use a combination of fixed-effect and random-effects regression analysis to test our hypotheses. Although our use of a randomized experimental design helps to eliminate the effect of subject unobservable attributes, we further controlled for these attributes by asking the responded for responses to two different scenarios. This allows us to use a fixed-effect analysis (Hausman, Hall, and Griliches, 1984). Unfortunately, fixed effects analyses also remove any variables that are fixed for the subject (e.g. their age). Where we wish to consider the potential effect of these variables, we attempt to use random-effects models. For random-effects models to be consistent, the random error associated with each unit (respondent) must not be correlated with other regressors. We tested this assumption using Hausman's (1978) test: the results of the test are reported below each table. Even when the Hausman test is not passed, we still report results for random-effects in order to observe the behavior of variables at the individual level, however we are more circumspect in the inferences we make.

4. Results

Our first set of hypotheses states the positive effect of expectation of adherence to norms (H1a), visibility of non-adherence to norms (H1b), and possibility to directly sanction non-adherence to norms (H1c) on knowhow transfer. As reported in table 5, our analysis supports H1a, does not support H1b and disconfirms H1c. In both fixed-effects models (model 1 and model 5) and random-effects models (model 2 and model 6), the coefficient for *appropriate behavior* is positive and highly significant, indicating that the expectation of appropriate behavior increases the willingness to transfer knowhow. Thus, we find support for Fauchart and Von Hippel's (2008) claim that expectation of pro-normative behavior increases willingness to transfer

knowhow. We find, however, no support for their contention that potential for or willingness to sanction non-compliance with norms would encourage transfer. The coefficient of *sanctionability* is not significant in any of the four models. Moreover, contrary to H1c, we find that, when respondents are thinking about their interaction with a restaurant they are more willing to punish, they are less likely to transfer the information. In other words, the coefficient for *punishment* is negative and significant in all four models.

-Insert Table 5 about here-

Our second set of hypotheses refers to the role that different IP strategies have in influencing the likelihood of knowhow transfer. In particular, we hypothesize a decreasing willingness to pass knowhow to similarly positioned industry players (H2). The hypothesis finds support in our data: the coefficients on *similarity of positioning* are negative and significant in both fixed-effects models (model 3 and model 5) and random-effects models (model 4 and model 6). Looking at characteristics of information, we expect to observe a positive effect of incomplete (H3a) and ephemeral (H3b) information on the likelihood of knowhow transfer. We find strong support for both hypotheses. The coefficients for *techniques* and *importance of change* are positive and significant in all specifications. According to H4, complementary assets should have a positive effect on knowhow transfer. However, we do not find support for this hypothesis when looking at upstream complementary assets (*unique suppliers*). For downstream complementary assets (*color*), the hypothesis is supported when we estimate a model which does not include any of our variable capturing normative control (model 4). In the overall model (model 6) the coefficient loses significance – suggesting that some relationship may exist between the norms and the effect of downstream complementary assets. We explore this in our next analysis. Finally, H5 postulates that similarity in approach to cuisine should increase the potential for gains from trade and this should increase knowhow transfer. Our data strongly support this

hypothesis, as shown by the positive and significant coefficient for *similarity of approach* in all specifications.

It is noteworthy that among our control variables, status of both of the actual respondent (*Michelin star*) and the fictitious chef (*status*) has a significant and positive impact on the likelihood of information transfer. This suggests that accomplished chefs tend to be more generous with their knowledge. We find supporting evidence for this in our interviews to top Italian chefs, during which we were told that “the more the level of dining increases, the more relevant this exchange becomes”. Highly reputed chefs have indeed a reputation for creativity, innovativeness, stylistic uniqueness. In the words of a two-starred chef: “secrecy belongs to an old approach. It used to happen that [high-end] chefs did not want to cook their own recipes in front of other chefs, that they kept them secret. In fact the chef had only those recipes, and, if someone copied them, he would have had no more ideas, nothing new to serve. Today this is not true anymore, since this is a context in which there is evolution, there is research.”

Table 6 displays seven fixed-effects models: the first six of them include one interaction term at the time, with the last one including all interactions and displaying results that are consistent with those from the previous six models.

-Insert Table 6 about here-

The first set of hypotheses postulates a substitution effect between the expectation of adherence to social norms and competitive positioning (H6a), characteristics of the information (H6b) and complementary assets (H6c). In other words, we expect that when interacted with *appropriate behavior* these three variables will have an effect on knowhow transfer that is opposite in sign compared to their main effect. We do not find support for H6a, as the effect is not significant. On the contrary, we do find support for H6b, as shown by the negative interactions between *appropriate behavior* and both *techniques* and *importance of change*. Finally, according to H6c, we expect the interaction between *appropriate behavior*

and complementary assets have a negative effect on information transfer. The hypothesis is not supported for upstream complementary assets (*unique suppliers*). Counter to our predictions, however, we find a significant positive interaction with downstream complementary assets (*color*). In other words, these assets complement social norms, rather than substituting them.

In H7 we hypothesize a complementary effect between the expectation of adherence to social norms and the potential for gains from trade. We find support for this hypothesis, as there is a positive interaction between the *appropriate behavior* and *similarity of approach*. In other words, social norms matter less when the possibility to gain from trades is low. This clearly emerges if we look at the graphical representation of the effect of the interaction between *appropriate behavior* and *similarity of approach* on knowhow transfer, as displayed in figure 2 (based on coefficients of main and interaction effects from model 6). When the potential for gains from trade is low, the expectation of appropriate behavior has a lower positive effect on the transfer of information. To the extreme, when *similarity of approach* approximates the lower bound, the effect of norms on information transfer is negligible and almost null.

-Insert Figure 2 about here-

Our analysis also allows us to begin to measure the explanatory power of the different theories of information transfer that we try to tease out in this contribution. Looking at the (within) R^2 of our models, we estimate that normative explanations by themselves explain 4.1% of the variance (table 5, model 1). In contrast, when considering strategic explanations by themselves, we explain 25% of the variance (table 5, model 3). If we include both explanations, we experience an increase in explanatory power, which amounts to 26.8% with an increment of 1.8% (table 5, model 5). While even 1.8% represents an important improvement for a topic as important as knowhow transfer, we believe that it also may underestimate the full value because the interaction may help initiate exchange that then is held in place by

one of the main effects. When introducing all the interactions between normative and strategic explanations, we observe an additional 1% increment in the explained variance, amounting to 27.8% (table 6, model 7).

5. Discussion and Conclusion

In this paper, we explore the conditions for knowhow transfer in an industry, gourmet cuisine, which is characterized by rapid innovation and weak protection of intellectual property. We investigate whether bilateral exchanges are facilitated by the existence of norms that reduce the risk of misappropriation or by IP strategies that decrease the potential for loss. Moreover, we disentangle how these different mechanisms interact. Using evidence from a scenario-based experiment, we demonstrate that norms may play a role in governing the use of transferred knowhow, but that IP strategies also play an important role. Finally, we show that norms substitute for some types of IP strategies but complement others.

We believe our analysis makes several contributions. From a theoretical point of view, to the best of our knowledge, our study is the first to test rival explanations for knowhow trading in the context of weak appropriability regimes. Not only do we test both normative and strategic explanations of knowhow transfer between competitors, but also we explore the interactions between these different mechanisms and their relative explanatory power. From a methodological point of view, the scenario-based experiment allows us to blend the rigor of experimental method with the richness and generalizability of field studies. In fact, by targeting real industry players, despite losing some of the cleanliness of laboratory experiments, we are able to improve the realism of our findings.

As with many exploratory studies, our research both clarifies issues and reveals new questions. We find some of the pieces needed to fill in the jigsaw puzzle of knowhow trading, and identify some new regions of the puzzle where pieces are missing or do not yet fit properly.

Some of the interesting pieces we uncover concern the role of norms in protecting intellectual property. We provide a more complete validation of the social norms argument by showing that the expectation of normative behavior eases the transfer of valuable and legally unprotected information. Firms are more willing to trade knowhow if they expect their counterparts to use it properly. This holds even if firms have access to mechanisms for protecting their IP. Indeed, the positive effect of norms on knowhow transfer persists when we take into consideration the substitution effect with barriers to imitation. In other words, even when IP strategies help secure knowhow transfer, firms prefer to pass knowledge to counterparts they trust more. Based on this evidence we can claim that the reputation-based idea trading described by Gans and Stern (2003) does not occur only in cases of weak intellectual property and weak complementary assets. Our results suggest that firms should invest in building a reputation for fairness even when operating under strong appropriability regimes.

Norms also appear to set the stage for relational contracts (Baker *et al.*, 2002). Indeed, they seem to influence whether or not a person expects an exchange with another to result in a mutual benefit. Thus norms may provide the starting point for relational contracting – determining when ongoing relationships are attempted.

We also show that the perception of norms is influenced by the dyadic characteristics of exchange partners. Results of our fixed-effects analyses show that the same subject changes his expectations of normative behavior depending on the characteristics of the counterpart with whom he is interacting. This evidence poses the intriguing question of what precise cues and heuristics chefs use to form their expectations of appropriate behavior. This issue goes beyond the scope of this study, but we hope to investigate it further in future research.

Our study also reveals some areas where there are missing pieces of the puzzle. First and foremost, our research presents a serious challenge to existing predictions of the relationship between sanctions, normative expectations, and

outcomes. We find no evidence that either the visibility of normative behavior or the propensity to sanction misdeeds is associated with either the expectation of adherence to norms or the transfer of knowhow. Indeed, the propensity to sanction renegeing on normative rules is associated with lower expectations of normative behavior and lower willingness to exchange information. Thus, our research provides a provocative puzzle. What maintains these expectations of pro-normative behavior? How can norms operate without enforcement? While we plan to explore these questions in future research, our interviews provide us with some clues for exploration.

Time and again, our informants confirmed the existence of norms in the industry, yet, punishment rarely surfaced in our discussions. When it did, the large majority of chefs would reveal that they would not punish those who violated the norm. Only one of our informants declared his willingness to punish, whereas all the others said they would not. As anecdotic evidence, one of our informants told us about the case of a young emerging chef who has become famous for one of the dishes that he learned from his master. According to our informant, despite this behavior being viewed as highly inappropriate, the chef has not been punished. In the informant's words: "[punishment] is subjective. It depends on the way you are. I would tend to let it go, but there are others who get mad... In my opinion, it depends also a lot on how "mature" you are." In other words there seems to be a stigma attached to punishment, based on which, paradoxically, those who punish end up being perceived in a bad way.

The interviews revealed that a different type of punishment may exist for those that renege: they lose the respect of their peers. This loss of respect seems disconnected from the economic value of the restaurant they own or run, but it may deprive the chef of some intrinsic value created by having the respect of colleagues. As an example, consider the case of one of the most expensive and successful restaurants in the city of Boston, Massachusetts. This restaurant is owned by a well-

known pirate of others' ideas (Murray, 2008). According to reported accounts, the owner obtained the ideas for the concept and menu for his restaurant by visiting well-regarded restaurants under the guise of an "out of work musician". He sat in the restaurant, asked many questions of the chefs, took notes, and then used these ideas to start his own business. Despite an exposé in a local paper, the chef remains unsanctioned: *New York Magazine* named his restaurant as the best emerging restaurant outside the city of New York (Bruni, 2008), while *Boston Magazine* elected it as the best restaurant in Boston for three years in a row (Boston Magazine, 2010). He also remains unsanctioned by customers, who give the restaurant a score of 28/30 on *Zagat* and 4.5/5 on *Yelp*. Analogously, a recent survey of reviews by prestigious specialized press elected this restaurant as the top restaurant in Boston (Traverso and Helterman, 2008). The only drawback that this chef seems to experience is the loss of the respect of his peers (Murray, 2008). Could this disregard be sufficient to hold in place normative behavior?

A second puzzling finding concerns downstream complementary assets. Counter to our predictions, they complement norms. This contradicts the notion of reputation-based idea trading (Gans and Stern, 2003) according to which firms rely on reputation when complementary assets are weak. In a reversed fashion, we observe that in this industry strong complementary assets reinforce reliance on reputation. We intend to pursue this question in future research.

We believe our study sheds light on a number of avenues for future investigation. Scholars might explicitly examine the conditions that lead to expectation of pro-normative behavior. Indeed, the fact that expectation of appropriate behavior can be manipulated experimentally creates room for contributions trying to address what ultimately drives this expectation among competing firms. Consistent with the puzzling finding about the apparent absence of enforcement for social norms, researchers could also explore what holds norms in place. Another important avenue for future research would be the exploration of the

interaction between ongoing exchange and norms. We suspect that constant exchanges of both information and material favors may influence familiarity and trust, ultimately affecting the expectation of compliance to social norms. In this respect, it may be interesting to study the role of geographic clusters. It is reasonable to imagine they give rise to social groups whose members expect others to conform to norms because of their engagement in a long term relationship of mutual benefit.

In conclusion, in an attempt to understand what pushes firms to engage in knowhow trading, our study teases out the contribution of two alternative mechanisms - social norms and IP strategies - and the contingencies under which they act as either complements or substitutes. We show that norms influence information transfer above and beyond the protection provided by common IP protection strategies and mechanisms. We show that adherence to social norms continues to matter even when other mechanisms for protecting IP are strong. Norms may even set the stage for some of these other mechanisms, for instance by influencing whether or not a person sees the outcome of an exchange moving toward conciliation or defection. Norms are indeed a powerful mechanism regulating the exchange of valuable, and apparently unprotected, information. Better understanding of the conditions under which normative controls of knowhow arise and are maintained could provide new insight into how innovation can be maintained in different competitive and institutional settings.

TABLE 1.
Descriptive Statistics of Population and Sample

	Population (n=2,529)				Respondents (n=534)		Non-respondents (n=1,995)		T-test	
	Mean	S.D.	Min	Max	Mean	S.D.	Mean	S.D.	T	Sig
Forks	1.81	0.70	1	5	1.95	0.76	1.77	0.68	-5.3576	0.00
Average Price ^a	44.60	17.53	17.5	260	48.52	21.90	43.54	16.00	-5.8695	0.00
Stars	0.12	0.38	0	3	0.22	0.38	0.09	0.33	-6.9511	0.00
Geographical Area ^b	1.77	0.83	1	3	1.70	0.84	1.78	0.83	2.0912	0.04

^a Expressed in Euros

^b Depending on the region in which they are located, restaurants were classified into three areas (1=north, 2=center and 3=south), following guidelines provided by the Italian Ministry for Economic Development (<http://www.sviluppoeconomico.gov.it/>).

TABLE 2.
Manipulated Variables and Corresponding Treatments

	High	Low
Geographical Proximity	Geographically very close to your restaurant	Geographically very distant from your restaurant
Similarity of Positioning	Cuisine Style and Ambience similar to your restaurant	Cuisine Style and Ambience different from your restaurant
Reputation	Zagalin: cuisine rating 28*. Comments: "creative", "innovative", "unique style". Chef has 20 years of experience in the industry	Zagalin: cuisine rating 20*. Comments: "lack imagination", "unoriginal", "ordinary style". Chef has 1 year of experience in the industry
Public Visibility	Frequently reviewed by local media and customers (among the restaurants with more reviews)	Rarely reviewed by local media and customers (among the restaurants with fewer reviews)

* This rating is equivalent to a rating from Zagat™. It ranges from 0 to 30.

TABLE 3.
Variables and Measures

Variable	Measure	Operationalization
Dependent Variable		
Knowhow Transfer	Likelihood that the respondent would provide information to the chef described in the scenario	If asked, how likely is it that you would provide (7-point likert scale): - <i>Information about a cooking technique.</i> - <i>The recipe of a dish.</i> - <i>The recipe of one of your signature dishes.</i>
Independent Variables		
Appropriate Behavior	Average of the chef described in the scenario is expected: (1) not to copy exactly; (2) to credit the author; (3) not to pass the information to others without permission	If you provided the recipe of a dish(/the recipe of one of your signature dishes/information about a cooking technique), how likely is it that this chef would (7-point likert scale): - <i>Modify the recipe rather than copying it exactly.</i> - <i>Credit you as the creator of the recipe.</i> - <i>Ask permission before passing the information to others.</i>
Sanctionability	Average of: in case of deviations from expected behavior it would be noticed by (1) other chefs (7-point likert scale); (2) media or customers	How likely is it that this chef's misbehavior would be noted by (7-point likert scale): - <i>Other chefs.</i> - <i>Third parties (media, customers).</i>
Punishment	Average of in case of deviations from expected behavior, the chef who provided the information: (1) engages in negative gossiping; (2) returns future request for help; (3) returns future request for information	If this chef copied the dish exactly (/copied the signature dish exactly/applied the technique to similar dishes or ingredients), how likely is that you would (7-point likert scale): - <i>Provide NO more information.</i> - <i>Provide NO more help (e.g., missing ingredients, emergency labor).</i> - <i>Tell other chefs about the attempt.</i>

Similarity of Positioning	Sum of: (1) Geographical Proximity; and (2) Product positioning	Manipulated
Techniques (Incomplete Information)	Likelihood of transferring a cooking technique compared to the recipe of a dish	Dummy
Importance of Change (Ephemeral Information)	Importance of menu changes for customers	Other information: <i>How important menu changes are to your customers?</i> (7-point likert scale)
Unique Suppliers and Color (Complementary Assets)	Unique suppliers: Reliance on unique suppliers Color: Awarded red forks	Other information: <i>Do you rely on unique suppliers?</i> (yes/no) source: Michelin
Similarity of Approach	Likelihood of similarity of approach to cuisine between respondent and chef described in the scenario	How likely is that this chef has an approach to cuisine similar to yours? (7-point likert scale)
Control Variables		
Status	Status	Manipulated
Frequency of review	Frequency of Review	Manipulated
Owner	Position in the organization, coded as 1 if chef owner, 0 otherwise	Other information: <i>Current position (Chef owner/Executive chef/Chef de cuisine/Sous-chef/Pastry-chef/Chef de Partie/Other)</i>
Male	Gender	Other information: <i>Gender?</i> (Male/female)
Chain	Affiliation to a chain	Other information: <i>Does your restaurant belong to a chain?</i> (yes/no)
Experience	Years of experience in the industry	Other information: <i>Years of experience in the industry?</i> (open)
Michelin Star	Awarded Michelin star(s)	source: Michelin

TABLE 4.
Descriptive Statistics and Correlations

Variable	Mean	S.d.	Min	Max	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. Knowhow Transfer	4.52	2.07	1	7	1.00																
2. Appropriate Behavior	3.76	1.21	1	7	0.24	1.00															
3. Sanctionability	4.21	1.61	1	7	0.01	0.21	1.00														
4. Punishment	3.24	1.66	1	7	-0.27	0.00	0.12	1.00													
5. Similarity of Positioning	0.03	1.41	-2	2	-0.04	-0.07	0.06	0.04	1.00												
6. Techniques	0.33	0.47	0	1	0.29	0.00	0.00	0.01	0.00	1.00											
7. Importance of Change	5.66	1.54	1	7	0.10	0.00	-0.01	-0.09	0.01	0.00	1.00										
8. Unique Suppliers	0.27	0.96	-1	1	0.00	0.00	0.05	-0.06	0.03	0.00	0.15	1.00									
9. Color	0.08	0.28	0	1	0.08	0.09	0.01	-0.06	-0.02	0.00	0.00	0.08	1.00								
10. Similarity of Approach	3.26	1.76	1	7	0.19	0.27	0.11	-0.12	0.02	-0.01	0.04	-0.03	-0.02	1.00							
11. Status	0.00	0.71	-1	1	0.05	0.07	0.00	0.01	-0.04	-0.01	0.04	0.06	0.01	0.18	1.00						
12. Frequency of Review	0.03	1.00	-1	1	0.01	-0.01	-0.03	0.01	0.00	0.01	0.01	0.02	-0.04	0.05	0.00	1.00					
13. Respondent: Owner	0.59	0.81	-1	1	-0.03	-0.06	-0.13	0.03	-0.03	0.00	0.05	0.03	-0.17	-0.05	0.02	-0.01	1.00				
14. Respondent: Male	0.63	0.77	-1	1	0.03	-0.02	0.00	-0.02	0.05	0.00	0.06	0.00	0.05	0.08	-0.04	-0.03	-0.18	1.00			
15. Respondent: Chain	-0.89	0.47	-1	1	0.02	-0.02	0.06	-0.03	0.04	0.00	0.07	0.00	0.12	-0.02	0.04	0.08	-0.09	0.09	1.00		
16. Respondent: Experience	26.78	9.92	4	60	-0.02	-0.09	0.02	0.00	0.02	0.00	-0.06	0.02	-0.10	-0.04	-0.04	0.02	0.18	0.01	-0.04	1.00	
17. Respondent: Michelin Star	-0.62	0.78	-1	1	0.08	0.10	0.05	0.02	0.00	0.00	0.09	0.10	0.21	-0.05	0.04	0.06	0.08	0.00	0.15	-0.07	1.00

TABLE 5.
Likelihood of Knowhow Transfer across Italian Restaurants and Chefs^a

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Coefficients	se	Coefficients	se	Coefficients	se	Coefficients	se	Coefficients	se	Coefficients	se
<u>Social Norms</u>												
Appropriate Behavior	0.225***	0.045	0.299***	0.037					0.156***	0.041	0.225***	0.035
Sanctionability	-0.008	0.040	-0.003	0.030					-0.015	0.035	-0.007	0.028
Punishment	-0.252***	0.043	-0.306***	0.030					-0.240***	0.038	-0.282***	0.028
<u>IP Strategies</u>												
Similarity of Positioning					-0.181***	0.024	-0.158***	0.023	-0.159***	0.024	-0.125***	0.023
Techniques					1.301***	0.050	1.300***	0.050	1.303***	0.049	1.301***	0.049
Importance of Change							0.123***	0.046			0.101**	0.043
Unique Suppliers							-0.044	0.074			-0.065	0.068
Color							0.520**	0.262			0.326	0.240
Similarity of Approach					0.133***	0.023	0.158***	0.021	0.090***	0.024	0.099***	0.021
<u>Controls</u>												
Status	0.233***	0.054	0.181***	0.049	0.226***	0.049	0.180***	0.046	0.192***	0.049	0.144***	0.045
Frequency of Review	0.031	0.037	0.029	0.035	0.036	0.033	0.031	0.031	0.028	0.032	0.023	0.031
Respondent: Owner			-0.041	0.083			-0.068	0.091			-0.044	0.084
Respondent: Male			0.077	0.085			0.044	0.092			0.051	0.084
Respondent: Chain			-0.006	0.142			-0.021	0.154			-0.018	0.141
Respondent: Experience			0.000	0.007			0.002	0.007			0.003	0.007
Respondent: Michelin Star			0.172**	0.084			0.171*	0.094			0.163*	0.086
_cons	4.517***	0.275	4.472***	0.309	3.658***	0.080	2.906***	0.384	4.052***	0.244	3.296***	0.401
N	2,927		2,927		2,927		2,927		2,927		2,927	
F	21.003***				162.264***				111.338***			
R ²	0.041		0.040		0.250		0.249		0.268		0.266	
Chi ²			224.244***				833.915***				1005.304***	
Hausman Test			Passed				Not Passed				Not Passed	

^a Within-R² (ω) reported for fixed- and random-effects; *** p<0.01, ** p<0.05, * p<0.1

TABLE 6.
Substitution and Complementarity Effects in Knowhow Transfer across Italian Restaurants and Chefs^a

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Coefficients	se	Coefficients	se	Coefficients	Se	Coefficients	se	Coefficients	se	Coefficients	se	Coefficients	se
<u>Social Norms</u>														
Appropriate Behavior (AB)	0.156***	0.041	0.187***	0.043	0.488***	0.151	0.158***	0.044	0.111***	0.042	0.026	0.070	0.382**	0.156
Sanctionability	-0.014	0.035	-0.017	0.035	-0.018	0.035	-0.015	0.035	-0.019	0.035	-0.018	0.035	-0.026	0.035
Punishment	-0.238***	0.038	-0.242***	0.038	-0.243***	0.038	-0.239***	0.038	-0.230***	0.038	-0.238***	0.038	-0.233***	0.038
<u>IP Strategies</u>														
Similarity of Positioning	-0.158***	0.024	-0.159***	0.024	-0.154***	0.024	-0.158***	0.024	-0.161***	0.024	-0.157***	0.024	-0.154***	0.024
Similarity of Positioning*AB	0.019	0.021											0.010	0.021
Techniques	1.303***	0.049	1.303***	0.049	1.302***	0.049	1.303***	0.049	1.303***	0.049	1.302***	0.049	1.301***	0.049
Techniques*AB			-0.100**	0.042									-0.096**	0.042
Importance of Change	(dropped)		(dropped)		(dropped)		(dropped)		(dropped)		(dropped)		(dropped)	
Importance of Change*AB					-0.058**	0.025							-0.068***	0.026
Unique Suppliers	(dropped)		(dropped)		(dropped)		(dropped)		(dropped)		(dropped)		(dropped)	
Unique Suppliers*AB							-0.007	0.042					0.002	0.044
Color	(dropped)		(dropped)		(dropped)		(dropped)		(dropped)		(dropped)		(dropped)	
Color*AB									0.504***	0.139			0.505***	0.140
Similarity of Approach	0.090***	0.024	0.091***	0.024	0.089***	0.024	0.090***	0.024	0.096***	0.024	0.087***	0.024	0.091***	0.024
Similarity of Approach * AB											0.038**	0.017	0.045***	0.017
<u>Controls</u>														
Status	0.197***	0.049	0.192***	0.049	0.193***	0.049	0.192***	0.049	0.197***	0.048	0.195***	0.049	0.204***	0.049
Frequency of Review	0.029	0.033	0.027	0.032	0.033	0.033	0.028	0.033	0.023	0.032	0.029	0.032	0.032	0.033
_cons	4.041***	0.244	3.948***	0.247	2.828***	0.587	4.041***	0.255	4.171***	0.245	4.530***	0.322	3.185***	0.605
N	2,927		2,927		2,927		2,927		2,927		2,927		2,927	
F	99.058***		99.787***		99.724***		98.930***		100.938***		99.705***		66.543***	
R ²	0.269		0.270		0.270		0.268		0.272		0.270		0.278	

^a Only fixed-effects reported (results are consistent with random effects). Within-R² (ω) reported. Appropriate Behavior is demeaned when interacted with the other independent variables to reduce collinearity. Controls at the respondent level, dropped by fixed-effects, are not reported.

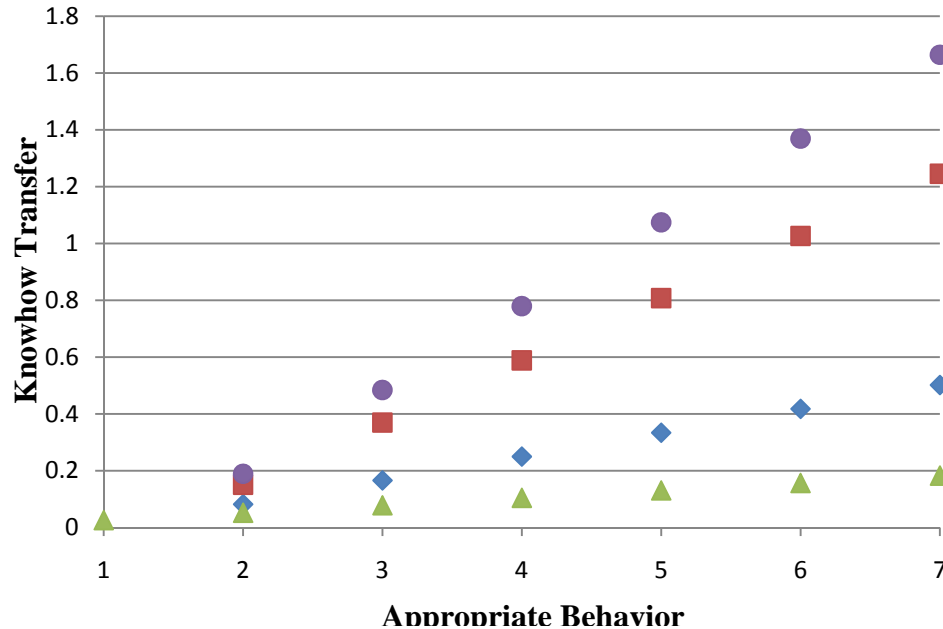
*** p<0.01, ** p<0.05, * p<0.1

FIGURE 1.
Sample Scenario

Characteristics of restaurant:	<ul style="list-style-type: none"> - Zagalin: cuisine rating 28*. Comments: "creative", "innovative", "unique style" - Physically very close to your restaurant - Cuisine Style and Ambience similar to your restaurant - Frequently reviewed by local media and customers (among the restaurants with more reviews)
Chef:	<ul style="list-style-type: none"> - Chef has 20 years of experience in the industry

** This rating is equivalent to a rating from Zagat™. It ranges from 0 to 30.*

FIGURE 2.
The Effect of Potential for Gains from Trade^a



^a As we move from the bottom to the top of the graph, the different symbols (triangles, rhombi, squares and circles) show the pattern of relationship between appropriate behavior and knowhow transfer, when similarity of approach is respectively two standard deviations below the mean, one standard deviation below the mean, one standard deviation above the mean and two standard deviations above the mean.

**APPENDIX A
TABLE A1.**

Knowhow Transfer across Italian Restaurants and Chefs (Effect of Closeness and Similarity)^a

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Coefficients	se	Coefficients	se	Coefficients	se	Coefficients	se	Coefficients	se	Coefficients	se
<u>Social Norms</u>												
Appropriate Behavior	0.225***	0.045	0.299***	0.037					0.155***	0.041	0.225***	0.034
Sanctionability	-0.008	0.040	-0.003	0.030					-0.015	0.035	-0.008	0.028
Punishment	-0.252***	0.043	-0.306***	0.030					-0.240***	0.038	-0.282***	0.028
<u>IP Strategies</u>												
Geographical Proximity					-0.220***	0.033	-0.203***	0.032	-0.197***	0.033	-0.169***	0.031
Product Positioning					-0.140***	0.034	-0.111***	0.032	-0.118***	0.034	-0.080**	0.032
Techniques					1.302***	0.050	1.302***	0.050	1.305***	0.049	1.303***	0.049
Importance of Change							0.121***	0.046			0.100**	0.042
Unique Suppliers							-0.045	0.074			-0.066	0.067
Color							0.512*	0.261			0.318	0.239
Similarity of Approach					0.124***	0.023	0.150***	0.021	0.082***	0.024	0.091***	0.022
<u>Controls</u>												
Status	0.233***	0.054	0.181***	0.049	0.231***	0.049	0.184***	0.046	0.197***	0.049	0.148***	0.045
Frequency of Review	0.031	0.037	0.029	0.035	0.035	0.033	0.030	0.031	0.026	0.032	0.022	0.031
Respondent: Owner			-0.041	0.083			-0.067	0.091			-0.044	0.083
Respondent: Male			0.077	0.085			0.044	0.092			0.051	0.084
Respondent: Chain			-0.006	0.142			-0.035	0.154			-0.032	0.141
Respondent: Experience			0.000	0.007			0.002	0.007			0.003	0.007
Respondent: Michelin Star												
_cons	4.517***	0.275	0.172**	0.084			0.170*	0.093			0.162*	0.086
N	2,927		4.472***	0.309	3.685***	0.081	2.930***	0.383	4.082***	0.244	3.315***	0.401
F	21.003***				2,927		2,927		2,927		2,927	
R ²	0.041				135.801***				99.352***			
Chi ²			0.040		0.251		0.250		0.269		0.267	
Hausman Test			224.244***				838.579***				1010.347***	
			Passed				Not Passed				Not Passed	

^a Within-R² (ω) reported

*** p<0.01, ** p<0.05, * p<0.1

TABLE A2
Substitution and Complementarity Effects in Knowhow Transfer (Effect of Closeness and Similarity)^a

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Coefficients	Se	Coefficients	se	Coefficients	Se	Coefficients	se	Coefficients	se	Coefficients	se	Coefficients	se
<i>Social Norms</i>														
Appropriate Behavior (AB)	0.155***	0.041	0.186***	0.043	0.472***	0.151	0.156***	0.044	0.110***	0.042	0.027	0.070	0.361**	0.158
Sanctionability	-0.014	0.035	-0.017	0.035	-0.018	0.035	-0.015	0.035	-0.019	0.035	-0.017	0.035	-0.026	0.035
Punishment	-0.238***	0.038	-0.242***	0.038	-0.243***	0.038	-0.240***	0.038	-0.231***	0.038	-0.238***	0.038	-0.234***	0.038
<i>IP Strategies</i>														
Geographical Proximity	-0.264**	0.109	-0.196***	0.033	-0.189***	0.033	-0.196***	0.033	-0.200***	0.033	-0.194***	0.033	-0.241**	0.110
Product Positioning	-0.185	0.115	-0.120***	0.034	-0.118***	0.034	-0.118***	0.034	-0.119***	0.034	-0.117***	0.034	-0.128	0.115
Geographical Proximity*AB	0.018	0.028											0.015	0.029
Product Positioning*AB	0.018	0.029											0.003	0.029
Techniques	1.305***	0.049	1.305***	0.049	1.304***	0.049	1.305***	0.049	1.305***	0.049	1.304***	0.049	1.303***	0.049
Techniques*AB			-0.099**	0.042									-0.095**	0.042
Importance of Change	(dropped)		(dropped)		(dropped)		(dropped)		(dropped)		(dropped)		(dropped)	
Importance of Change*AB					-0.055**	0.025							-0.065**	0.026
Unique Suppliers	(dropped)		(dropped)		(dropped)		(dropped)		(dropped)		(dropped)		(dropped)	
Unique Suppliers*AB							-0.003	0.042					0.005	0.044
Color	(dropped)		(dropped)		(dropped)		(dropped)		(dropped)		(dropped)		(dropped)	
Color*AB									0.508***	0.139			0.508***	0.140
Similarity of Approach	0.082***	0.024	0.083***	0.024	0.081***	0.024	0.082***	0.024	0.088***	0.024	0.079***	0.024	0.084***	0.024
Similarity of Approach * AB											0.038**	0.017	0.045***	0.017
<i>Controls</i>														
Status	0.201***	0.049	0.197***	0.049	0.198***	0.049	0.197***	0.049	0.202***	0.049	0.200***	0.049	0.208***	0.049
Frequency of Review	0.027	0.033	0.026	0.032	0.032	0.033	0.027	0.033	0.022	0.032	0.028	0.032	0.029	0.033
_cons	4.071***	0.245	3.978***	0.248	2.912***	0.589	4.076***	0.256	4.202***	0.246	4.554***	0.323	3.287***	0.612
N	2,927		2,927		2,927		2,927		2,927		2,927		2,927	
F	81.317		90.137		90.030		89.381		91.222		90.067		58.370	
R ²	0.270		0.271		0.271		0.269		0.273		0.271		0.279	

^a Only fixed-effects reported (results are consistent with random effects). Within-R² (ω) reported. Appropriate Behavior is demeaned when interacted with the other independent variables to reduce collinearity. Controls at the respondent level, dropped by fixed-effects, are not reported.

*** p<0.01, ** p<0.05, * p<0.1

Essay 2.

Mysteries in the Air: Agglomeration, Social Norms, and Knowledge Transfer¹⁰

Knowledge spillovers among agglomerated firms can allow valuable information to diffuse among competitors. Such a phenomenon may be particularly problematic when the transferred knowledge is not protected by property rights. How do co-located firms protect themselves from the risks associated with knowledge transfer? In this paper, we propose that the density inherent in agglomeration facilitates the maintenance of norms that restrict the misuse of transferred information. To test our theory, we use an experimental design to measure conditional knowledge transfer among head chefs in gourmet restaurants. Our results show that subjects in clusters expect potential competitors to adhere to social norms and are more willing to transfer knowledge. Our analysis supports the idea that clustering reinforces adherence to social norms, thus promoting knowledge transfer across co-located firms.

1. Introduction

At the end of the nineteenth century, Alfred Marshall indentified the factors favoring geographic concentration of industries. The existence of knowledge spillovers among clustered firms, he argued, was one of them. Marshall noted that within clusters, “the mysteries of the trade become no mysteries; but are as it were in the air” (Marshall, 1920 [1890]: 271). Following this intuition, research on the geographical component of competition has focused on the role geographical clusters play in promoting the spillover of knowledge among firms in an attempt to measure the source and extent of spillovers and the implications for firm strategy (Alcácer and

¹⁰The essay is co-authored with Andrew A. King (Dartmouth College) and Gianmario Verona (Bocconi University). The authors acknowledge financial support from the Research Division “Claudio Dematté” of SDA Bocconi School of Management, Bocconi University and the Tuck School of Business at Dartmouth. The authors wish to thank Wilbur Chung, Elena Dalpiaz, Adam Kleinbaum, Myles Shaver, and David Waguspak for their insightful comments on previous versions of the manuscript.

Chung, 2007; Almeida and Kogut, 1999; Chung and Alcácer, 2002; Chung and Kalnins, 2001; Song, Almeida, and Wu, 2003).

Knowledge¹¹ flows within clusters in many ways: in public documents, such as patents (Jaffe, Trajtenberg, and Henderson, 1993); in workers who move among firms (Zucker, Darby, and Brewer, 1998); in founders of new companies (Klepper, 2007); and through voluntary disclosure between knowledge holders (Singh, 2005). In this article, we consider this last form of transfer—voluntary disclosure—and ask how knowledge transfer is influenced by agglomeration. Many authors have demonstrated that intra-firm knowledge transfer is an important part of knowledge flows and that such peer-to-peer transfer often involves information not protected by property rights (Allen, Hyman, and Pinckney, 1983; von Hippel, 1987). Transfer of unprotected information is particularly surprising since secrecy is an important (if not the only) means of protecting knowledge in situations where property rights are lacking. In clusters, such voluntary revealing is even more remarkable because any information transferred from one party may rapidly diffuse to others. Once it has been transferred, such proprietary knowledge may easily become knowledge that is “in the air.”

In this paper, we claim that clusters actually contain the seeds of their own protection because they support the formation of social norms¹² governing the use of transferred knowledge, thus substituting for formal property rights. We theorize that firms located in clusters have higher expectations that their counterparts will conform to social norms restricting the use of unprotected information. We argue that,

¹¹ Knowledge refers to “the accumulated practical skill or expertise which allows one to do something smoothly and efficiently [...] develop its products and develop and operate its processes.” (von Hippel, 1987: 291).

¹² Social norms are private decentralized institutions created and enforced by members of social groups. Indeed, “rules [...] may also arise in a decentralized way, through interaction and taking the form of norms. Norms may specify that neighboring ranchers look out for one another’s cattle or that coworkers cover for one another in an illness” (Ingram and Clay, 2000: 530).

ironically, the very proximity clusters provide creates a safe environment in which firms trust each other and can safely exchange knowledge.

We test our theory by studying an industry, gourmet cuisine, in which there are no legal mechanisms for protecting intellectual property. In particular, we focus on the transfer of knowledge about cuisine elements, such as recipes and cooking techniques. Previous research has documented the role of social norms in regulating knowledge transfer in this industry (Fauchart and von Hippel, 2008). We seek to extend this research by understanding how geographical clusters influence patterns of social norms and knowledge transfer.

We conducted our research by first engaging in detailed interviews with numerous chefs and industry experts. Based on these interviews, we developed a theory of transfer and tested it using a scenario-based experiment that we administered to an extensive sample of Italian chefs.¹³ We propose that a scenario-based experiment may be a valuable way to gather new insights because it allows the use of experimental treatments and direct measurement of perceptions. Moreover, use of an experimental design, administered to a large population of respondents, represents a new research approach in the domain of literature on both knowhow transfer and information flows in agglomerated areas (cf. Ratanawarada and Polenske, 2007).

The paper is organized as follows: We review extant literature and discuss the role of clustering on social norms and knowledge transfer in section 2. The empirical approach is presented in section 3, followed by results (section 4) and robustness tests (section 5). We conclude in section 6 by thoroughly discussing the implications of our findings and acknowledging the limitations of our study.

¹³ For more on this technique, see Florey and Harrison (2000) and Gomez, Kirkman, and Shapiro (2000).

2. Theory and Hypotheses

In this paper, we claim that clusters support the formation of social norms governing the use of transferred knowledge. Following previous contributions (Ingram and Clay, 2000; Ingram and Silverman, 2002), we define social norms as private decentralized institutions. Social norms represent rules that are used by members of social groups and enforced through social relationships, with the group members themselves monitoring compliance to the norms and sanctioning deviations from them (Greif, 1993).

Social norms are deeply connected to knowledge transfer. They play a fundamental role in the creation, prosper, and survival of interpersonal relationships (Robson, Katsikeas, and Bello, 2008)¹⁴, which, in turn, promote the interorganizational transfer of knowledge (Darr, Argote, and Epple, 1995). Moreover, social norms have been shown to substitute for intellectual property rights when such regulatory institutions are missing, thus favoring the transfer of otherwise unprotected knowledge. Social norms protect such knowledge by stipulating how information obtained from other parties can be used, how attribution of intellectual property will be made, and the punishment that will occur if the other parties do not conform to those norms (Fauchart and von Hippel, 2008).

We propose that the density inherent in agglomerations facilitates the maintenance of social norms that restrict the misuse of transferred information. Our argument is based on literature that suggests the proximity inherent in business agglomerations increases the development of social capital and the density characterizing clusters facilitates social control, thus promoting the emergence of trust.

¹⁴ Social norms are indeed one of the antecedents of trust (Robson, Katsikeas, and Bello, 2008), defined as the extent to which a firm believes that its exchange partner is honest and/or benevolent (Zaheer, McEvily, and Perrone, 1998), thus establishing a belief that the partner will not use transferred knowledge at the focal firm's expense (Li, Poppo, and Zhou, 2010).

A first line of theory emphasizes the role of geographic clusters in favoring the development of social capital (Putnam, 1993; 2000), defined as “the ability of actors to secure benefits by virtue of membership in social networks or other social structures” (Inkpen and Tsang, 2005: 150). According to this line of reasoning, agents are biased toward interaction with nearby agents (Holland, 1992; 1995) because local understanding of rules and norms promotes cooperation (Riolo, Cohen, and Axelrod, 2001; Sigmund and Nowak, 2001). Repeated interactions in local areas tend to produce clusters of cooperating individuals “who are less exposed to exploitative agents who might otherwise take advantage of the tendency to cooperate” (Axelrod, Riolo, and Cohen, 2002: 342). Maillat (1995) emphasizes the interaction that takes place between economic, sociocultural, political, and institutional actors in a given place and calls this the local milieu. It is an area for “collective learning through intense interaction between a broadly composed set of actors” (Maskell and Malmberg, 1999: 174). For business agglomerations, Camagni (1995) identifies spatial density as a key determinant of the formation of network ties and facilitation of interactions that allow firms and individuals to exchange knowledge (Inkpen and Tsang, 2005). Scholars have proposed that these interpersonal relations can cause firms in business districts to experience an advantage over firms that are not embedded in this network of relationships (Inkpen and Tsang, 2005). As a result, Putnam (2000) argues that development of social capital allows the creation of governance rules that reduce market inefficiencies and facilitate economic development.

A second line of reasoning that draws from the literature on social networks leads to a similar theory by emphasizing the effect of density on social control and hence trust, defined as the extent to which a firm believes its exchange partner is honest and/or benevolent (Zaheer, McEvily, and Perrone, 1998). According to this literature, physical agglomeration aids the formation of a dense network of relationships where actors share a high number of common ties. When a social

network displays great density, or network closure (Coleman, 1988; 1990), the presence of common ties between actors increases monitoring and compliance with norms. Network closure also increases the potential for social sanctioning, which, in turn, gives rise to higher incentives to cooperate (Allcott *et al.*, 2007). In a dense network, it is difficult to escape the notice of others and sanctions are facilitated, thus creating a safe environment that promotes the expectation others will follow appropriate behavioral norms.

The literature on governance of common pool resources (CPR) also notes the importance of spatial density to the development of regulatory norms. Elinor Ostrom (1990: 183–184) notes that “[i]ndividuals repeatedly communicate and interact with one another in a localized physical setting. Thus [...] they can learn whom to trust, what effects their actions will have on each other and on the CPR, and how to organize themselves to gain benefits and avoid harm. When individuals have lived in such situations for a substantial time and have developed shared norms and patterns of reciprocity, they possess social capital with which they can build institutional arrangements for resolving CPR dilemmas.” Following this line of reasoning, informal governing institutions, such as social norms, are more likely and more effective when participants are able to negotiate rules, observe compliance, and sanction non-adherence. Physical proximity and multiple contact points are critical parts of all three conditions (Ostrom, 1990; Poteete, Janssen, and Ostrom, 2010). Density aids in the development of normative rules. It also increases the ability to monitor neighbors’ actions. This increased monitoring ability should favor trust among neighboring firms. Finally, density aids the administration of sanctions and makes it more likely such sanctions will be understood as supportive of social norms.

In our qualitative research, we received numerous reports that confirmed these theoretical insights. For example, when we asked a chef in an area with few restaurants about her interaction with local chefs, her business partner interrupted to say the local chefs did not cooperate. “Only here,” the chef replied. “When I was [in

a dense area], I talked a lot with other chefs.” We also observed that interviewees located in clusters reported greater expectation that their local competitors would adhere to behavioral norms. This is also connected to higher interrelationships between actors located in such areas. In the words of one chef, “You might need some dinner napkins some night at the last minute because you are running low. Or you might need five pounds of swordfish from someone. Or you might need a busboy really badly. [Your neighbors] are resources. It is never good to burn bridges.”

In summary, we expect to observe a higher expectation of adherence to social norms within clusters, as firms are located in contexts in which social capital is high, interactions are frequent, and deviations from expected behavior can be easily detected.

H1a: The higher the agglomeration, the higher the expectation of appropriate behavior.

Normative control is most important when parties have private incentives to maximize their own returns at the expense of others. It is this conflict between private gain and public benefit that creates the need for institutions, and it is for this reason that scholars from Bernard Mandeville (2007 [1732]) to Elinor Ostrom (1990) have considered the role of institutions in preventing private benefit at the expense of social gain.

In the context of knowledge transfer, private gain is most relevant when the party receiving the knowledge has an incentive to copy it for his or her competitive advantage. When the sender of this knowledge is not competing with the receiver, such behavior is not much of a concern and abidance to normative rules is less important. However, when the sender is competing directly with the receiver, adherence to norms is most important and parties with knowledge should most seek protection from local behavioral norms. If density influences norms that regulate

misappropriation of transferred knowledge, we should expect it to have the greatest effect on expectation about competitors' behavior.

H1b: The higher the agglomeration, the higher the expectation of appropriate behavior on the part of neighboring competitors.

Finally, if norms have economic meaning, they should also influence the behavior of actors. Consistent with our earlier arguments, we expect norms will influence communication within agglomerated areas. We expect this effect will be strongest among potential competitors since it is for such actors that normative controls are most needed to prevent appropriation of transferred knowledge.

H2a: The higher the agglomeration, the higher the likelihood of knowledge transfer.

H2b: The higher the agglomeration, the higher the likelihood of knowledge transfer to neighboring competitors.

3. Method

In the above section, we develop a theory of the effect of agglomeration on the expectation that other firms will comply with social norms and transfer knowledge to other firms. We chose to test this theory by evaluating norms and knowhow transfer in gourmet cuisine. This is an industry where the existence of social norms regulating the transfer of knowledge has been documented (Fauchart and von Hippel, 2008). It also exhibits geographic variability in agglomeration.

We test our theory by means of a scenario-based experiment (Florey and Harrison, 2000; Gomez, Kirkman, and Shapiro, 2000) that we distributed to the population of Italian chefs as defined by the 2009 Italian edition of the Michelin Guide. The next section describes in detail our empirical design, as well as the variables and econometric approach we use.

3.1. Empirical Design

3.1.1. Participants. Our scenario-based experiment targeted real industry players in the context of gourmet cuisine. To identify the participants, we turned to the Michelin Guide, which is reputed as the most prestigious and reliable opinion leader in this context (Ferguson, 1998), as testified also by the numerous studies based on it (Durand, Rao, and Monin, 2007; Fauchart and von Hippel, 2008; Rao, Monin, and Durand, 2003, 2005). The Michelin Guide includes only restaurants that satisfy a minimum quality standard. Once a restaurant enters the guide, it is evaluated based on a system of “forks” and “stars.” Forks indicate a restaurant’s “décor, ambience and service” on a five-point scale, ranging from “quite comfortable” to “luxurious.” Within each category of comfort, forks are colored in red when the restaurants are “particularly pleasant or restful.” Restaurants are awarded stars based on their culinary excellence. Michelin stars indicate culinary artistry and as such represent one of the top achievements a chef can achieve in his or her career. Stars range from one star (i.e., “a very good restaurant in its category”) to three stars (i.e., “exceptional cuisine, worth a special journey”).

The 2009 Italian edition of the Michelin Guide included 2,529 restaurants. Among these, 236 were awarded one star, 34 were awarded two stars, and 5 were awarded three stars, for a total of 275 “starred” restaurants. We contacted the head chefs of all the restaurants in the guide by mailing and emailing them a survey through which we administered our scenario-based experiment. Our response rate was equal to 21.1 percent, with 534 surveys returned. Our respondents were mainly male (82 percent) restaurant owners (78 percent) in a range of different ages (46 years old on average, with a minimum of 23 and a maximum of 80 years), some of whom were awarded stars (respectively 74, 16, and 2 for each category from one to three stars). In this respect, it is worth noting that the restaurants in our sample tend to be significantly more expensive and better rated, as shown by the significance of our t-tests in Table 1. Despite the significant differences, the

magnitude of these effects is quite small.¹⁵ The differences do suggest, however, that our results will be more indicative of behavior of higher-end restaurants.

-Insert Table 1 about here-

3.1.2. Procedure. Each restaurant received a mailed survey addressed to its head chef. In the cover letter, we briefly explained the purpose of the study and gave chefs the option to complete the survey using the enclosed paper form or by going online to a specific website.¹⁶ Each respondent was assigned two scenarios describing a potential restaurant with which he or she may have happened to interact and asked to answer a set of questions about knowledge transfer with respect to the restaurant chefs described in each of them. We also asked our respondents to provide information on personal demographics and restaurant characteristics.

3.1.3. Experimental Design. Following methodological recommendations, we developed the scenarios through direct interaction with a selected set of informants. To this end, we interviewed all Michelin-starred chefs working in one major Italian city (Milan), for a total of eight informants. The interviews covered a variety of topics, ranging from training and cuisine style to social norms, knowledge transfer, and relationships with colleagues and intermediaries. The interviews, which lasted from 45 minutes to 1 hour, were held at the firm location and were tape-recorded, transcribed, and coded. Four of the informants were interviewed again to assess face validity of the scenario and the survey used to administer it. As a last step, we ran a pretest of our experiment on a sample of 224 restaurants that were not part of the final sample.

¹⁵ Given the large size of the sample, we report effect sizes (Cohen's *d*). The values are inferior to 0.5 in all cases, showing that the differences between respondents and nonrespondents are relatively small although significant.

¹⁶ Note that 94 percent of respondents returned two scenarios and the remaining 6 percent returned from one to six scenarios (having completed the survey both off-line and online), for a total of 1,030 scenarios for 502 completed surveys.

The scenarios described a restaurant based on four characteristics, which constitute our experimental manipulations. In particular, our experimental design is a 2 (geographical proximity) x 2 (product positioning) x 2 (reputation) x 2 (public visibility). We rely on a mixed design, combining within- and between-subject assignment, since each respondent was randomly assigned two of the sixteen different scenarios. Figure 1 shows a sample scenario, while the manipulations are described in Table 2.

-Insert Figure 1 and Table 2 about here-

Geographical proximity was manipulated by describing the restaurant as “physically very close to your restaurant” (high) versus “physically very distant from your restaurant” (low). Based on comments by our informants, we did not insert any reference point (such as 5 miles away or within the same block) to avoid differences caused by modes of transport. Since our treatment is a concrete statement of fact, no manipulation check was needed (Perdue and Summers, 1986).

Product positioning was manipulated by describing the restaurant as “cuisine style and ambience similar to your restaurant” (high) versus “cuisine style and ambience very different from your restaurant” (low). The manipulation check was performed by asking respondents to evaluate, on a seven-point Likert scale, to what extent the restaurant described in the scenario was comparable to their own restaurants in terms of positioning ($F(1,1063)=8.43, p=0.00$).

Reputation was manipulated by describing the restaurant as “Zagalin cuisine rating 28. Comments: creative, innovative, unique style. Chef has 20 years of experience in the industry” (high) versus “Zagalin cuisine rating 20. Comments: lacks imagination, unoriginal, ordinary style. Chef has 1 year of experience in the industry” (low). The Zagalin (a fictional name) rating was explained as being equivalent to a ZagatTM rating from 0 to 30. The manipulation check was performed by asking respondents to evaluate, on a 7-point Likert scale, to what extent the chef described

in the scenario was likely to be considered highly prestigious by colleagues ($F(1,1060)=9.07, p=0.00$).

Public visibility was manipulated by describing the restaurant as “frequently reviewed by local media and customers (among the restaurants with more reviews)” (high) versus “rarely reviewed by local media and customers (among the restaurants with fewer reviews)” (low). As above, we avoided inserting any reference point (such as among the 5 percent top reviewed restaurant) to avoid any subjectivity in the interpretation. As a consequence, since our treatment is a concrete statement of fact, no manipulation check was needed (Perdue and Summers, 1986).

Based on our interviews, we concluded it was not possible to manipulate the degree to which the respondents felt they were in an agglomerated area. Thus, we decided to measure the actual density of their area. Of course, this means this variable is endogenously determined. We discuss tests to correct or bound this problem in section 5.

3.2. Variables

3.2.1. Dependent Variables. Our two main dependent variables are *adherence to social norms* and *knowledge transfer*. *Adherence to social norms* is the expectation that the chef described in the scenario will adhere to the social norms Fauchart and von Hippel (2008) identify as regulating knowledge transfer among chefs. According to the authors, and consistent with the results of our qualitative inquiry, the transfer of culinary knowledge is regulated by three basic social norms. When a chef receives recipe-related information from another chef, he or she (1) must not copy the recipe exactly, (2) must credit the recipe’s author when significantly relying on it to develop a dish, and (3) must not pass the recipe-related information to a third party without asking for said author’s permission (Fauchart and von Hippel, 2008). We measure *adherence to social norms* as the average likelihood that if the chef in the scenario received recipe-related information from our

respondent, (s)he would not have copied the recipe exactly, would have credited the author of the recipe, and would not have passed the information to a third party without asking for permission. The sign and significance of our reported results do not vary if the three items are entered separately into our model.

Knowledge transfer is the likelihood the respondent would pass knowledge to the chef described in the scenario, measured on a 7-point Likert scale. When asking about the transfer of information, we distinguished among three types of information that could be shared—specifically, recipes, recipes of signature dishes, and cooking techniques.¹⁷ We marked the three different types of information with dummy variables and combined the three reports of knowledge transfer (recipes, signature dishes, techniques) into one database. By construction, this raises the number of observations threefold.

3.2.2. Independent Variables. Hypotheses 1a and 2a postulate respectively that agglomeration will exert a positive effect on the expectation of adherence to social norms and likelihood of knowledge transfer. We measure *agglomeration* based on the measure for localized density suggested by Sorenson and Audia (2000), but computed only for the twenty nearest neighbors. Our measure is:

$$Agglomeration = \sum_{j=1}^{20} \frac{1}{D_{ij}}. \quad \text{Eq. 1}$$

where D_{ij} is the great circle distance between firms i and j , and the sum is computed for the j nearest twenty neighbors. The reason we restricted the measure to the nearest twenty neighbors lies in the geographical conformation of Italy as a peninsula. The original measure seems to underestimate the agglomeration of areas located next to the sea. Note that as shown in Figure 2, coastal regions (such as the areas around Palermo and Naples) receive relatively lower agglomeration measures,

¹⁷ A signature dish is a dish that uniquely identifies a chef and is commonly associated with her or his cuisine. Even if the menu is changed frequently, these dishes are always present, as they represent their inventors' artistry, style, and approach to cuisine.

while regions in the north of Italy (such as Liguria, Lombardy, and Emilia Romagna) receive inflated scores. Our modified measure better matches practical experience.¹⁸

-Insert Figure 2 about here-

Hypotheses 1b and 2b predict the positive effects of agglomeration—respectively on the expectation of adherence to social norms and on the likelihood of knowledge transfer—will be stronger in the case of neighboring competitors. We identify a *neighboring competitor* based on two specific dimensions, *geographical proximity* and *similarity of positioning*, variables that we manipulate in the scenario. This is consistent with reports from our informants as well as previous accounts in the hospitality industry (Baum and Mezias, 1992). We aggregate the two manipulations into the variable we call *neighboring competitor*, which is equal to zero if two firms are distant and differently positioned, one if two firms are close, and two if two firms are close and similarly positioned. We opt for this measure since we need competing firms to be at least geographically close if we have to test a theory of competition in geographical clusters. Indeed, our argument cannot apply to competing but not geographically proximate establishments since it is not possible by definition for them to be located in the same cluster. In other words, geographical proximity is a *conditio sine qua non* in our study. However, from a practical point of view, our results are consistent if the two manipulations are entered separately into our model or if we use a simple sum of the two manipulations rather than the linear combination we adopt.

Finally, we included a series of controls in our analysis. At the respondent level, we control for position in the organization (*owner*), gender (*male*), years of experience in the industry (*experience*), affiliation to a chain (*chain*), and reputation

¹⁸ We performed a series of successful robustness checks on this measure by restricting it to the nearest ten neighbors or enlarging it to the nearest forty neighbors. We chose to report results at the intermediate level to balance the trade-off between the fidelity to our sample's characteristics (decreasing with the number of nearest neighbors) and estimation precision (increasing with the number of nearest neighbors).

as measured by presence of Michelin stars (*reputation*). Two variables we manipulated in the scenario, *reputation* and *public visibility*, were used as controls at the level of the chef described in the scenario. A comprehensive list of the variables, together with their measures and operationalization, is shown in Table 3. Descriptive statistics and correlations are shown in Table 4.

-Insert Tables 3 and 4 about here-

3.3. Econometric Approach

We use both fixed- and random-effects regression analysis to test our hypotheses. Reliance on a randomized experimental design helps to eliminate the effect of subject-unobservable attributes. However, we further controlled for these attributes by asking our subjects to respond to two different scenarios. The presence of two scenarios per respondent allows us to use fixed effects (Hausman, Hall, and Griliches, 1984). Our specification is:

$$Y_{i,s} = B(X_{i,s}) + u_i + e_{i,s} \quad \text{Eq. 2}$$

where $Y_{i,s}$ is the response for restaurant i based on scenario s . We include fixed effects u_i for each facility; thus, in the fixed-effect specification, our coefficient estimations are based on the different stimulations created by the two scenarios.

In order to consider the potential effect of variables, such as experience, at the respondent level, we also ran random-effects specifications that do not remove variables that are fixed for the subjects. For random-effects models to be consistent, the random error associated with each subject must not be correlated with other regressors. We test this assumption using Hausman's (1978) test; we report whether we passed this test below each random-effects model. Note that we report results for random effects also for those cases in which the Hausman test was not passed. In this way, we can observe the behavior of variables at the individual level even if we are more circumspect in the inferences we make.

4. Results

We hypothesize that agglomeration will increase expectations that other chefs will adhere to social norms (H1a) and we further hypothesize this effect will be particularly strong for chefs who are neighboring competitors (H1b). Table 5 reports our analysis aimed at testing these hypotheses through both fixed effects (models 1 and 3) and random effects (models 2 and 4).

As reported in Table 5, our analysis partially supports H1a: the coefficient for *agglomeration* is significant when only main effects are entered into the regression (model 2). However, this coefficient loses its statistical significance when the interaction term between *neighboring competitor* and *agglomeration* is entered into the regression (model 4). The coefficient for this interaction term is positive and significant across all specifications, supporting H1b. Our results indicate that expectations of adherence to social norms improve in denser areas, but this effect is strongest for, and may be limited to, neighboring competitors. In other words, our results demonstrate that agglomeration increases the expectation that neighboring competitors will adhere to social norms.

-Insert Table 5 about here-

Our second set of hypotheses uses knowledge transfer as a dependent variable. Results of our empirical analysis are reported in Table 6. In particular, we hypothesize an increasing likelihood of transferring knowledge in general (H2a) and particularly to neighboring competitors (H2b) when located in highly agglomerated areas. We do not find support for H2a, as shown by the positive but non-significant coefficient for *agglomeration* in model 2. However, we do find support for H2b; the coefficients on the interaction between *neighboring competitor* and *agglomeration* are positive and significant in both fixed-effects models (model 3 and model 5) and random-effects models (model 4 and model 6). Once again, it appears agglomeration has an effect on willingness to transfer information, but the effect is limited to neighboring competitors.

The effect of clustering on the likelihood to transfer knowledge emerges clearly if we look at the graphical representation of the effect of interaction between *neighboring competitor* and *agglomeration* on knowledge transfer, as displayed in Figure 3 (based on coefficients from models 4 and 6, Table 6). When *agglomeration* is low, the likelihood to transfer knowledge decreases for increasing levels of *neighboring competitor*. By comparison, when *agglomeration* is high, the likelihood to transfer knowledge increases for increasing levels of *neighboring competitor*.

It is worth noting that the expectation of adherence to social norms has a partial mediating role in this respect: when introducing this variable (models 5 and 6), the effect of the interaction term is reduced and becomes less significant.¹⁹ Because some of the effect of *agglomeration* passes through the mediating variable, *adherence to social norms*, the lines in Figure 3 are less steep when *adherence to social norms* is entered into the regression (model 6).

Overall, our results support the idea that when located in dense areas, neighboring competitors will be more likely to transfer knowledge. In particular, we show this effect is partially mediated by social norms; clusters indeed promote adherence to social norms, which end up encouraging knowledge transfer.

-Insert Table 6 and Figure 3 about here-

5. Robustness Tests

In the above section, we interpret our results as suggesting that the degree of agglomeration increases the expectation of adherence to social norms and the likelihood of knowledge transfer among competing firms. In this section, we attempt

¹⁹ Such a test of mediating relationships is often inappropriate (Shaver, 2005). In our case, however, it is appropriate because our use of a randomized experiment and fixed individual effects helps reduce the propensity for correlated error terms within our system of equations. We also tested empirically for correlation in the residuals for our predictions of *adherence to social norms* and *knowhow transfer*. We found a very poor correlation of 0.02. Thus, we concluded we could evaluate the mediating relationship without the use of instrumental variables.

to separate the evidence for this interpretation from other possible explanations. To do this, we conducted a series of robustness tests.

The first rival explanation we investigate is that our results are driven by a selection process that alters the nature of chefs operating in dense versus non-dense areas. One could argue that people get selected into clusters based on some characteristics that have to do with their propensity to trust and cooperate with their competitors. If so, the fact that we observe the association of agglomeration with the expectation of adherence to norms and the likelihood of transferring knowledge could be an artifact of the original location choice firms make.

If selection were indeed responsible, we would expect normative expectations and transfer likelihood to differ for all firms, not just neighboring competitors. Our regression results suggest this is not the case. More specifically, we rule out this alternative explanation by comparing the average score for the expectation of adherence to norms and the likelihood to transfer knowledge in dense and non-dense areas. The difference is not significant, as shown by the t-tests reported in Table 7.

-Insert Table 7 about here-

A second concern deals with differentiation. In fact, one could argue that firms located in clusters do not infringe the intellectual property of their neighbors because this potentially could reduce their differentiation in the eyes of customers. This differentiation principle (Tirole, 1997) is central to spatial models of competition (Graitson, 1982) and suggests that firms sharing the same location will try to maximize differentiation from their neighboring competitors over other meaningful dimensions. In equilibrium, firms will choose positions that allow them to capture the maximum number of potential customers. Following this argument, one could argue that firms in dense areas not infringing on each other's intellectual property (i.e., not copying each other) may not depend on their adherence to social norms but on their desire to avoid losing potential customers and profits.

We try to rule out this alternative explanation by looking at only one of the three norms described in Fauchart and von Hippel (2008). Social norms in this industry stipulate that when a chef receives recipe-related information from another chef, he or she (1) must not copy the recipe exactly, (2) must credit the recipe's author when significantly relying on it to develop a dish, and (3) must not pass the recipe-related information to a third party without asking for said author's permission. We repeat our analysis by looking only at this last norm. This norm should not be affected by the incentive of the receiver of the transferred knowledge to move his/her position closer to the sender; that is, it should be independent of the motivation for differentiation across the establishments involved in the transfer. Results, shown in Table 8, confirm that when located in agglomerated areas, firms expect their neighboring competitors to adhere to this norm as well. Thus, it appears the effect of density on norms is not just determined by relative differences in incentives to differentiate products.

-Insert Table 8 about here-

A third possible concern is that barriers to entry might alter the nature of competition in dense and non-dense areas. One could argue that the observed positive relationship between agglomeration and knowledge transfer among competitors is not due to the agglomeration of the area itself but to different competitive conditions that may characterize certain areas. In other words, what we are picking up is not the effect of agglomeration but the effect of a more general advantage some areas may enjoy. As a consequence, firms should be more willing to engage in knowledge transfer with their neighbors because they all share a pooled return. Consider, for instance, the case of food districts—that is, areas that are well known for the quality, quantity, and variety of their restaurants. In these cases, firms located in the area may be more trustworthy and cooperative with each other since they all work for the same objective of increasing the area's reputation and success. As one of our interviewees said, "The more the merrier. Get them in here. If Central

Square becomes the place where people come out for dinner, I think we all benefit. You should see this as a good thing. If we do our job and attract some guests, they end up in your restaurant if they can't get in ours. Isn't that a good thing?" This is consistent with previous accounts of cooperation being fostered by the presence of a common objective and salient rivals (Ingram and Inman, 1996).

In order to rule out this alternative explanation, we first measure each player's *ability to capture value* by looking at the degree to which restaurants in an area appear able to change abnormal prices. To create this measure, we first regress the average price each restaurant charges (as reported by the Michelin Guide) against a series of restaurant attributes and local demographics (see Appendix A). The regression is estimated according to the specification:

$$P_i = B(X_i) + e_i \quad \text{Eq. 3}$$

The error term of this regression (price residual) provides our measure of the restaurant's ability to charge an abnormal price. Then we measure the relative advantage of local areas by computing *area advantage*—that is, the average *ability to capture value* for players located in the area. We do this by computing the Sorenson and Audia (2000) measure adjusted to the nearest twenty restaurants and weighted by price residuals. Our measure is:

$$\text{Area Advantage} = \sum_{j=1}^{20} \frac{e_i}{D_{ij}}. \quad \text{Eq. 4}$$

where e_i is the price residual obtained from the regression result (Eq. 3) and D_{ij} is the great circle distance between firms i and j . The sum is computed for j ranging from the first to the twentieth nearest neighbor.

As shown in Tables 8 and 9, we find no evidence that the relative advantage of an area has any effect. The interaction between *area advantage* and *neighboring competitor* does not have a significant effect on either *adherence to social norms* (Table 8) or *knowledge transfer* (Table 9).

-Insert Table 9 about here-

A final concern deals with incentives to keep information private. One may argue that firms located in clusters are more willing to transfer knowledge because involuntary knowledge spillovers are so great that all knowledge is already “in the air.” There would be no incentive for them not to engage in knowledge transfers since their knowledge would end up flowing within the cluster anyway.

We try to rule out this alternative explanation by looking at the effect the interaction between *agglomeration* and *neighboring competitor* has on the likelihood of requesting (rather than transferring) knowledge. If firms located in clusters will get knowledge “through the air,” they should be less likely to ask such knowledge directly of their neighbors. Although our tests reveal that chefs are less likely to ask their competitors, they do not reveal that these behaviors change on average in clusters or for competitors who are co-located in clusters, thus providing no evidence in support of this alternative explanation (see models 7 and 8 of Table 9).

6. Discussion and Conclusion

Scholars have argued that strong legal protection of intellectual property can be a valuable means of facilitating safe knowledge transfer among firms located in clusters (Porter, 1990). However, not all industries are protected by strong intellectual property rights, not all firms can access them, and not all knowledge can be safely secured. When knowledge is not legally protected, its transfer is particularly surprising since it implies giving away secrecy—its only means of protection. In clusters, such voluntary revealing is even more remarkable since any information transferred from one party may diffuse rapidly to others. Once it has been transferred, proprietary knowledge may indeed easily flow “in the air.” How do co-located firms protect themselves from such risk of knowledge depletion?

In this paper, we argue that clusters actually contain the seeds of their own protection. We focus on voluntary transfer of knowledge among firms located in clusters. We expect firms located in densely populated areas to be more prone to

engage voluntarily in knowledge transfers, particularly with co-located firms, even when legal protection of the transferred knowledge is not available. We argue this is the case because clusters favor the formation of social norms—that is, informal institutions regulating relationships among members of the cluster and granting protection to the transferred knowledge.

Our results show that clusters strengthen adherence to social norms and increase transfer of knowledge across co-located firms. Within the gourmet cuisine industry, we show that expectations of adherence to social norms improve in denser areas, but this effect is particularly strong for neighboring competitors. In other words, agglomeration increases the expectation that neighboring competitors will adhere to social norms. Also, we show that when located in dense areas, neighboring competitors will be more likely to transfer knowledge. This effect is partially mediated by social norms; clusters promote adherence to social norms, which end up encouraging knowledge transfer.

We contribute to the literature through two main findings. First, we show that the effect of norms is contextual. It can be influenced by characteristics of the counterparts involved in a transaction, as well as by characteristics of the environment in which firms are located. This is mirrored in our results, which show that the expectation competitors will adhere to social norms is stronger when the structural characteristics of an industry create the basis for more cooperation.

Second, and with a more particular focus on geographical clusters, we show that norms may be able to substitute for missing institutions and protect information in clusters. In contexts in which legal protection of intellectual property is weak, information transfer is secured by the existence of social norms that members of geographical clusters are expected to adhere to and that have a strong positive effect on the likelihood to transfer information. In this respect, our study helps explain why creative firms can cluster. Despite the lack of formal protection of valuable knowledge, these firms can indeed benefit from the protection of social

norms. Also, we show that clusters carry their own protection. Agglomeration has a positive effect on the expectation that competitors will adhere to social norms, and it increases the propensity to transfer information.

Our study has limitations. It analyzes only one industry, gourmet cuisine. In this industry, it is reasonable to expect clustering will be heavily influenced by customer location, which could indeed offer an additional explanation for the propensity of these firms to transfer knowledge. Higher demand could increase the incentives to look for external knowledge. Future studies could extend our findings to contexts in which customer location does not as strongly drive agglomeration.

A second limitation of our research is endogenous to the use of a scenario-based experiment and lies in the fact that we measure intended, rather than real, action. We tried to counter this potential problem, however, by supporting our quantitative evidence with qualitative evidence gathered through interviews. Finally, our models explain a minority of the variance for the expectation of adherence to social norms (3 percent). This comes as no surprise. First, we report within variance, capturing the variance we can explain by comparing the two scenarios each chef faced. Moreover, it is reasonable to expect one type of contextual characteristics (i.e., agglomeration) may have a limited impact on social norms, which mostly have been described as influenced by, for instance, the availability of mechanisms for observing and sanctioning deviations (Ingram and Clay, 2000). The investigation of the role these mechanisms play falls beyond the scope of our study, and hence we leave it open to future research. However, our predictive ability rises dramatically when looking at the likelihood of knowledge transfer (18 percent) in line with previous literature on clusters (Alcácer and Chung, 2007; Audretsch and Feldman, 1996; Jaffe, Trajtenberg, and Henderson, 1993; Krugman, 1991).

We believe our study makes some important contributions. From a methodological point of view, the use of experimental design combined with its administration to a large population of respondents allows us to explore an

alternative avenue for research on knowledge transfer in clusters, which usually has relied on secondary data, such as patent citations (cf. Ratanawarada and Polenske, 2007). We propose that scenario-based experiments may be a valuable way to gather new insights because they allow direct study of subjects' perceptions.

From a theoretical point of view, we have provided evidence that favors the role of clusters on institutions—that is, the social norms that regulate and protect the transfer of information within these contexts. Also, we have shown that clusters have an impact on knowledge by influencing the willingness of competitors to share valuable intellectual property.

In summary, our study untangles the conditions under which firms transfer information to their neighbors. In doing so, we show the relevance of social norms as a valuable means to protect intellectual property and favor the transfer of knowledge, even among competing firms. We show that clusters can contain the seeds of their own protection. The very proximity that clusters provide creates a safe environment in which firms trust each other and may safely exchange information. Firms located in clusters will indeed expect their neighbors to conform to social norms and thereby restrict the use of information obtained from other firms in the cluster. Better understanding of the mechanisms behind this effect could provide new insight into the geography of innovation, location choices, and, ultimately, the incentives behind innovation efforts.

TABLE 1.
Descriptive Statistics of Population and Sample

	Population (n=2,529)				Respondents (n=534)		Non-respondents (n=1,995)		T-test		Cohen's d
	Mean	S.D.	Min	Max	Mean	S.D.	Mean	S.D.	t	Sig	d
Forks	1.81	0.70	1	5	1.95	0.76	1.77	0.68	-5.3576	0.00	0.29
Average Price ^a	44.60	17.53	17.5	260	48.52	21.90	43.54	16.00	-5.8695	0.00	0.26
Stars	0.12	0.38	0	3	0.22	0.38	0.09	0.33	-6.9511	0.00	0.38

^a Expressed in Euros

TABLE 2.
Manipulated Variables and Corresponding Treatments

	High	Low
Geographic Proximity	Geographically very close to your restaurant	Geographically very distant from your restaurant
Similarity of Positioning	Cuisine Style and Ambience similar to your restaurant	Cuisine Style and Ambience different from your restaurant
Reputation	Zagalin: cuisine rating 28*. Comments: "creative", "innovative", "unique style". Chef has 20 years of experience in the industry	Zagalin: cuisine rating 20*. Comments: "lack imagination", "unoriginal", "ordinary style". Chef has 1 year of experience in the industry
Public Visibility	Frequently reviewed by local media and customers (among the restaurants with more reviews)	Rarely reviewed by local media and customers (among the restaurants with fewer reviews)

* This rating is equivalent to a rating from Zagat™. It ranges from 0 to 30.

TABLE 3.
Variables and Measures

Variable	Measure	Operationalization
Dependent Variables		
Knowledge Transfer	Likelihood (scale of three measures) that the respondent would provide information to the chef described in the scenario	<i>If asked, how likely is that you would provide (7-point likert scale):</i> - <i>Information about a cooking technique</i> - <i>The recipe of a dish</i> - <i>The recipe of one of your signature dishes</i>
Adherence to Social Norms	Likelihood (scale of three measures) that the chef described in the scenario will comply with norms	<i>If you provided the recipe of a dish(/the recipe of one of your signature dishes/information about a cooking technique), how likely is it that this chef would (7-point likert scale):</i> - <i>Modify the recipe rather than copying it exactly</i> - <i>Credit you as the creator of the recipe</i> - <i>Ask permission before passing the information to others</i>
Independent Variables		
Neighboring Competitor	Sum of Geographical Proximity and Product Positioning	Experimentally Manipulated
Agglomeration	Localized density	Sorenson and Audia (2000) density measure, restricted to the twenty nearest neighbors
Control Variables		
Alter: Reputation	Prestige	Experimentally Manipulated
Alter: Public visibility	Frequency of Review	Experimentally Manipulated
Respondent: Owner	Ownership of the restaurant	<i>Current position (Chef owner/Executive chef/Chef de cuisine/Sous-chef/Pastry-chef/Chef de Partie/Other)?</i>
Respondent: Male	Gender	<i>Gender?(Male/female)</i>

Respondent: Chain	Affiliation to a chain	<i>Does your restaurant belong to a chain? (yes/no)</i>
Respondent: Experience	Years of experience in the industry	<i>Years of experience in the industry?</i>
Respondent: Reputation	Culinary recognition	Chef is awarded Michelin star(s)
Knowledge type	Signature Dish, Dish, Cooking Technique	Three conditions tested in survey
Variables used for Robustness Tests		
Adherence to Social Norms Not Affecting Differentiation	Likelihood that the chef described in the scenario will not to pass the information to others without permission	<i>If you provided the recipe of a dish(/the recipe of one of your signature dishes/information about a cooking technique), how likely is it that this chef would (7-point likert scale):</i> <i>- Ask permission before passing the information to others</i>
Area Advantage	Degree to which the twenty nearest neighbors are able to change abnormally high prices	Residual of the regression of average price on restaurant attributes and local demographics (see Appendix A) for the twenty nearest neighbors
Knowledge Request	Likelihood (scale of three measures) that the chef described in the scenario would ask for information to the respondent	<i>How likely is that the chef described in the scenario would ask you (7-point likert scale):</i> <i>- Information about a cooking technique</i> <i>- The recipe of a dish</i> <i>- The recipe of one of your signature dish</i>

TABLE 4.
Descriptive Statistics and Correlations

Variable	Mean	S.D.	Min	Max	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Knowledge Transfer	4.80	1.96	1	7	1.00											
2. Adherence to Social Norms	3.91	1.16	1	7	0.30	1.00										
3. Neighboring Competitor	0.76	0.83	0	2	-0.07	-0.08	1.00									
4. Agglomeration	3.88	3.05	0.54	15	0.04	0.07	0.02	1.00								
5. Area Advantage	0.20	3.22	-8.31	9.81	0.02	-0.01	0.05	0.36	1.00							
6. Alter: Reputation	0.00	0.71	-1	1	0.04	0.06	-0.06	-0.05	0.00	1.00						
7. Alter: Public Visibility	0.02	1.00	-1	1	0.00	0.00	-0.01	0.00	-0.01	0.01	1.00					
8. Respondent: Owner	0.58	0.82	-1	1	-0.03	-0.07	-0.02	-0.20	-0.08	0.01	0.00	1.00				
9. Respondent: Male	0.64	0.77	-1	1	0.03	-0.01	0.04	0.07	0.07	-0.02	-0.04	-0.18	1.00			
10. Respondent: Chain	-0.88	0.47	-1	1	0.03	-0.03	-0.02	0.05	0.05	0.05	0.09	-0.11	0.09	1.00		
11. Respondent: Experience	26.76	9.92	4	60	-0.04	-0.12	0.03	-0.04	0.01	-0.05	0.03	0.19	0.01	-0.03	1.00	
12. Respondent: Reputation	-0.63	0.78	-1	1	0.07	0.10	-0.01	0.00	0.01	0.05	0.06	0.06	0.00	0.17	-0.07	1.00

TABLE 5.
Expectation of Adherence to Social Norms across Italian Restaurants and Chefs^a

	Model 1	Model 2	Model 3	Model 4
	coef (se)	coef (se)	coef (se)	coef (se)
Neighboring Competitor (NC)	-0.103** (0.030)	-0.096** (0.028)	-0.230** (0.048)	-0.177** (0.045)
Agglomeration		0.030* (0.015)		0.012 (0.017)
Agglomeration*NC			0.034** (0.010)	0.021* (0.009)
Alter: Reputation	0.221** (0.035)	0.192** (0.033)	0.225** (0.035)	0.194** (0.033)
Alter: Public Visibility	0.040 (0.024)	0.027 (0.023)	0.042 (0.024)	0.028 (0.023)
Knowledge type: Signature Dish	0.103** (0.037)	0.103** (0.037)	0.103** (0.037)	0.103** (0.037)
Respondent: Owner		-0.077 (0.058)		-0.073 (0.058)
Respondent: Male		-0.034 (0.058)		-0.034 (0.058)
Respondent: Chain		-0.122 (0.098)		-0.114 (0.098)
Respondent: Experience		-0.009* (0.005)		-0.009* (0.005)
Respondent: Reputation		0.152** (0.058)		0.150** (0.058)
_cons	3.772** (0.031)	3.960** (0.172)	3.767** (0.031)	4.032** (0.175)
N	3,096	3,096	3,096	3,096
F	16.132**		15.246**	
Chi ²		79.021**		84.553**
R ² (ω)	0.024	0.024	0.029	0.028
Hausman		Passed		Not Passed

^a Within-R² (ω) reported for fixed- and random-effects

* p<0.05, ** p<0.01

TABLE 6.
Likelihood of Knowledge Transfer across Italian Restaurants and Chefs ^a

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	coef (se)	coef (se)	coef (se)	coef (se)	coef (se)	coef (se)
Neighboring Competitor (NC)	-0.261** (0.041)	-0.238** (0.038)	-0.399** (0.066)	-0.361** (0.061)	-0.328** (0.066)	-0.284** (0.061)
Agglomeration		0.028 (0.022)		0.001 (0.024)		-0.002 (0.023)
Agglomeration*NC			0.037** (0.014)	0.033* (0.013)	0.028* (0.014)	0.025* (0.012)
Adherence to Social Norms					0.304** (0.043)	0.383** (0.035)
Alter: Reputation	0.180** (0.048)	0.158** (0.045)	0.184** (0.048)	0.160** (0.045)	0.125** (0.048)	0.095* (0.044)
Alter: Public Visibility	-0.006 (0.033)	-0.004 (0.031)	-0.004 (0.033)	-0.003 (0.031)	-0.018 (0.033)	-0.015 (0.031)
Knowledge type: Signature Dish	-1.055** (0.051)	-1.055** (0.051)	-1.055** (0.051)	-1.055** (0.051)	-1.055** (0.050)	-1.055** (0.050)
Respondent: Owner		-0.014 (0.085)		-0.008 (0.085)		0.022 (0.080)
Respondent: Male		0.070 (0.085)		0.070 (0.085)		0.073 (0.079)
Respondent: Chain		0.028 (0.144)		0.041 (0.144)		0.099 (0.134)
Respondent: Experience		-0.003 (0.007)		-0.003 (0.007)		0.001 (0.006)
Respondent: Reputation		0.175* (0.085)		0.172* (0.085)		0.111 (0.079)
_cons	5.345** (0.043)	5.391** (0.252)	5.338** (0.043)	5.500** (0.256)	4.126** (0.178)	3.863** (0.282)
N	3,096	3,096	3,096	3,096	3,096	3,096
F	123.096**		100.167**		93.269**	
Chi ²		496.575**		504.384**		632.405**
R ² (ω)	0.160	0.160	0.162	0.162	0.178	0.177
Hausman		Passed		Passed		Not Passed

^a Within-R² (ω) reported for fixed- and random-effects. * p<0.05, ** p<0.01

TABLE 7.
Adherence to Social Norms and Knowledge Transfer in Dense vs. Non-Dense Areas

	Population (n=3,255)		< Average agglomeration (n=2,265)		> Average agglomeration (n=990)		T-test	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	t	Sig
Adherence to Social Norms	3.737	0.02	3.717	0.03	3.783	0.04	-1.293	0.20
Knowledge Transfer	4.820	0.03	4.821	0.04	4.817	0.06	0.054	0.96

TABLE 8.
The Effect of Differentiation and Local Competition^a

	<i>Adherence to Norm 3 Only (Norm Not Affecting Differentiation)</i>				<i>Adherence to All Three Social Norms</i>			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	coef (se)	coef (se)	coef (se)	coef (se)	coef (se)	coef (se)	coef (se)	coef (se)
Neighboring Competitor (NC)	-0.115** (0.036)	-0.118** (0.034)	-0.321** (0.057)	-0.287** (0.054)	-0.103** (0.030)	-0.096** (0.028)	-0.237** (0.050)	-0.180** (0.046)
Agglomeration		0.041 (0.022)		0.004 (0.024)		0.034* (0.016)		0.015 (0.018)
Agglomeration*NC			0.056** (0.012)	0.045** (0.011)			0.037** (0.011)	0.023* (0.010)
Area advantage						-0.012 (0.015)		-0.009 (0.016)
Area advantage*NC							-0.006 (0.011)	-0.003 (0.010)
Alter: Reputation	0.172** (0.042)	0.172** (0.040)	0.178** (0.042)	0.175** (0.040)	0.221** (0.035)	0.192** (0.033)	0.225** (0.035)	0.194** (0.033)
Alter: Public Visibility	0.029 (0.029)	0.034 (0.028)	0.032 (0.029)	0.036 (0.028)	0.040 (0.024)	0.026 (0.023)	0.041 (0.024)	0.027 (0.023)
Knowledge type: Signature Dish	0.000 (0.044)	0.000 (0.044)	0.000 (0.044)	-0.000 (0.044)	0.103** (0.037)	0.103** (0.037)	0.103** (0.037)	0.103** (0.037)
Respondent: Owner		-0.216* (0.087)		-0.207* (0.087)		-0.077 (0.058)		-0.073 (0.058)
Respondent: Male		-0.148 (0.086)		-0.148 (0.087)		-0.032 (0.058)		-0.032 (0.058)
Respondent: Chain		-0.051 (0.146)		-0.033 (0.146)		-0.120 (0.098)		-0.111 (0.098)
Respondent: Experience		-0.026** (0.007)		-0.026** (0.007)		-0.009* (0.005)		-0.009* (0.005)
Respondent: Reputation		0.084 (0.086)		0.079 (0.086)		0.152** (0.058)		0.150** (0.058)
_cons	2.875** (0.037)	3.664** (0.255)	2.865** (0.037)	3.816** (0.258)	3.772** (0.031)	3.942** (0.173)	3.766** (0.031)	4.020** (0.177)
N	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096
F	7.445**		10.280**		16.132**		12.756**	
Chi ²		70.069**		86.047**		79.656**		85.203**
R ² (ω)	0.011	0.011	0.019	0.019	0.024	0.024	0.029	0.028
Hausman		Passed		Passed		Passed		Not Passed

^a Within-R² (ω) reported for fixed- and random-effects

* p<0.05, ** p<0.01

TABLE 9.
The Effect of Local Competition and Knowledge Spillovers ^a

	<i>Knowledge Transfer</i>				<i>Knowledge Request</i>			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	coef (se)	coef (se)	coef (se)	coef (se)	coef (se)	coef (se)	coef (se)	coef (se)
Neighboring Competitor (NC)	-0.261** (0.041)	-0.239** (0.038)	-0.427** (0.068)	-0.391** (0.063)	-0.134** (0.045)	-0.113** (0.041)	-0.154** (0.072)	-0.140** (0.066)
Agglomeration		0.028 (0.023)		-0.008 (0.026)		-0.006 (0.021)		-0.012 (0.024)
Agglomeration*NC			0.047** (0.015)	0.043** (0.014)			0.005 (0.015)	0.007 (0.014)
Area Advantage		0.000 (0.022)		0.021 (0.024)				
Area Advantage*NC			-0.025 (0.014)	-0.026 (0.013)				
Alter: Reputation	0.180** (0.048)	0.158** (0.045)	0.185** (0.048)	0.161** (0.045)	-0.459** (0.052)	-0.396** (0.048)	-0.458** (0.052)	-0.396** (0.048)
Alter: Public Visibility	-0.006 (0.033)	-0.004 (0.031)	-0.006 (0.033)	-0.004 (0.031)	0.018 (0.037)	0.020 (0.034)	0.019 (0.037)	0.020 (0.034)
Knowledge type: Signature Dish	-1.055** (0.051)	-1.055** (0.051)	-1.055** (0.051)	-1.055** (0.051)	-0.367** (0.055)	-0.367** (0.056)	-0.367** (0.055)	-0.367** (0.056)
Respondent: Owner		-0.014 (0.085)		-0.007 (0.086)		-0.140* (0.082)		-0.138* (0.082)
Respondent: Male		0.070 (0.085)		0.066 (0.086)		0.198** (0.082)		0.198** (0.082)
Respondent: Chain		0.028 (0.144)		0.046 (0.144)		0.093 (0.139)		0.096 (0.139)
Respondent: Experience		-0.003 (0.007)		-0.003 (0.007)		0.007 (0.006)		0.007 (0.006)
Respondent: Reputation		0.175* (0.085)		0.171* (0.085)		-0.026 (0.082)		-0.027 (0.082)
_cons	5.345** (0.043)	5.391** (0.254)	5.338** (0.043)	5.537** (0.259)	3.478** (0.047)	3.312** (0.243)	3.477** (0.047)	3.336** (0.248)
N	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096
F	123.096**		84.057**		31.827**		25.477**	
Chi ²		496.565**		508.775**		129.299**		129.571**
R ² (ω)	0.160	0.160	0.163	0.163	0.047	0.047	0.047	0.047
Hausman		Passed		Passed		Not Passed		Passed

^a Within-R² (ω) reported for fixed- and random-effects

* p<0.05, ** p<0.01

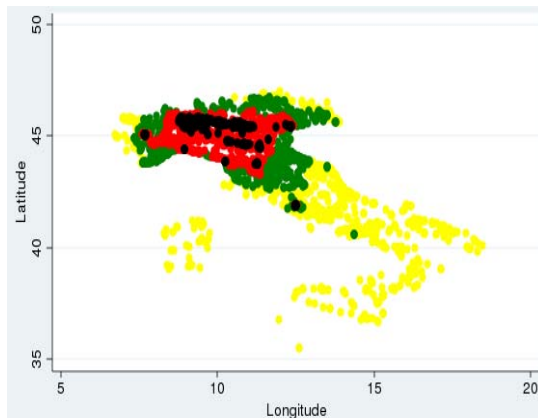
FIGURE 1.
Sample Scenario

Characteristics of restaurant:	<ul style="list-style-type: none"> - Zagalin: cuisine rating 28*. Comments: "creative", "innovative", "unique style" - Geographically very close to your restaurant - Cuisine Style and Ambience similar to your restaurant - Frequently reviewed by local media and customers (among the restaurants with more reviews)
Chef:	<ul style="list-style-type: none"> - Chef has 20 years of experience in the industry

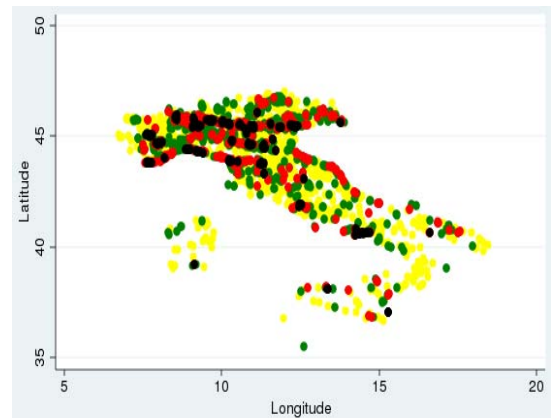
** This rating is equivalent to a rating from Zagat™. It ranges from 0 to 30.*

FIGURE 2.
A Visualization of Agglomeration*

Sorenson and Audia (2000) measure

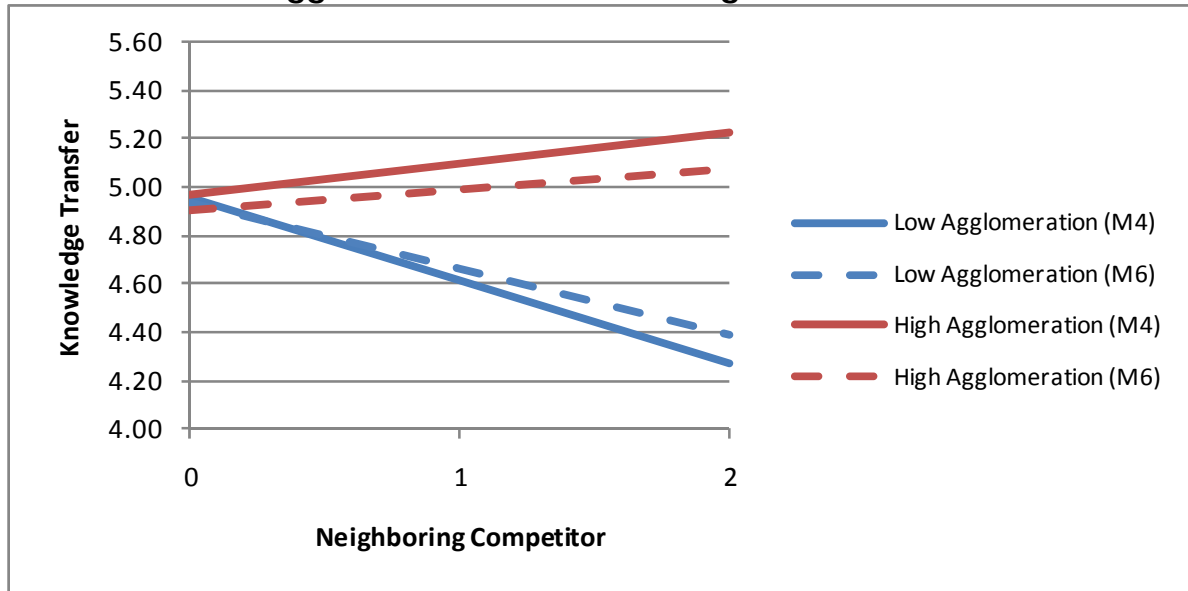


Adjusted Sorenson and Audia (2000) measure



*The color of dots indicates increasing agglomeration of the area in which each dot (restaurant) is located, going from yellow (minimum agglomeration), to green, red, and black (maximum agglomeration) for increasing levels of agglomeration.

FIGURE 3.
Agglomeration and Knowledge Transfer *



* The lines show the effect of *agglomeration* on the relationship between *neighboring competitor* and *knowledge transfer*. Knowledge transfer is calculated at the minimum ("Low Agglomeration") or maximum ("High Agglomeration") level of agglomeration, with *neighboring competitor* ranging from 0 to 2. The other variables are kept at the mean level. The coefficients are those shown in table 6, model 4 (M4 - without *adherence to social norms*) and model 6 (M6 - including *adherence to social norms*).

Appendix A
TABLE A1.
Variables and Measures

Variable	Measure	Source
Average Price	Average price charged by the restaurant	source: Michelin (Guide, 2009)
Forks	Comfort: based on "décor, ambience and service", it ranges from 1 ("quite comfortable") to 5 ("luxurious").	source: Michelin (Guide, 2009)
Color	Uniqueness: within each category of comfort, forks are colored in red when restaurants provide "particularly pleasant or restful establishments" as a result of "the character of the building, its décor, the setting, the welcome and services offered [...]". Dummy variable.	source: Michelin (Guide, 2009)
Stars	Quality: based on food quality, it ranges from 0 to 3 stars (i.e. "exceptional cuisine, worth a special journey").	source: Michelin (Guide, 2009)
Promise	Emergent Quality: based on food quality, it qualifies restaurants that are expected to get their first star in the following year	source: Michelin (Guide, 2009)
Inhabitants_kmq	Agglomeration measured as the ratio between number of inhabitants and square kilometers. Measured at the level of the province.	source: ISTAT (Census, 2001)
Unemployment Rate	Percentage of unemployed workers. Measured at the level of the province.	source: ISTAT (Census, 2001)
Family Members	Average family members. Measured at the level of the province.	source: ISTAT (Census, 2001)
Tourists 2007	Total number of tourists (both Italian and foreign). Measured at the level of the region.	source: Italian Ministry of Tourism (Tourism data, 2007)

TABLE A2.
Descriptive Statistics and Correlations

Variables	Mean	Std. Dev.	Min	Max	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Average Price	44.60	17.53	17.5	260	1.00								
2. Forks	1.81	0.70	1	5	0.64	1.00							
3. Color	0.06	0.23	0	1	0.29	0.21	1.00						
4. Stars	0.12	0.38	0	3	0.63	0.44	0.25	1.00					
5. Promise	0.00	0.06	0	1	0.06	0.05	0.04	-0.02	1.00				
6. Inhabitants_kmq	959.47	1585.48	2	8566	0.11	0.01	-0.02	-0.01	0.00	1.00			
7. Unemployment Rate	8.09	6.32	0	39.07	-0.05	-0.05	-0.03	-0.04	0.03	0.06	1.00		
8. Family Members	2.48	0.26	1.67	3.88	-0.08	0.03	0.02	0.03	0.05	-0.28	0.41	1.00	
9. Tourists 2007 (millions)	6,294	7,775	0,078	33,600	0.17	0.03	0.04	0.01	0.00	0.14	-0.06	0.06	1.00

Table A3.
Average Price of Italian Restaurants

	Model 1	
	<i>Coefficient</i>	<i>Standard Error</i>
Forks	10.705**	0.345
Color	7.308**	0.962
Stars	19.726**	0.633
Promise	14.425**	3.593
Inhabitants_kmq	0.001**	0.000
Unemployment Rate	0.121	0.083
region==Abruzzo	-4.197	2.891
region==Basilicata	-7.502*	3.527
region==Calabria	-3.647	3.443
region==Campania	-1.343	2.949
region==Emilia Romagna	-1.836	2.500
region==Friuli Venezia Giulia	-4.492	2.688
region==Lazio	-3.693	2.705
region==Liguria	2.543	2.558
region==Lombardia	-1.395	2.485
region==Marche	-1.022	2.775
region==Molise	-5.271	3.903
region==Piemonte	-4.532	2.492
region==Puglia	-5.183	3.050
region==Sardegna	0.561	3.135
region==Sicilia	-3.595	3.047
region==Toscana	-0.770	2.497
region==Trentino Alto Adige	-10.600**	2.774
region==Umbria	-2.810	2.858
region==Valle d'Aosta	<i>(dropped)</i>	
region==Veneto	-1.867	2.554
Family Members	-5.760**	1.149
Tourists 2007	0.000**	0.000
_cons	34.901**	3.486
N	2,528	
F	159.626**	
R ²	0.633	

* p<0.05, ** p<0.01

Essay 3.

Live and Let Live? A Study of the Enforcement of Social Norms ²⁰

Literature on social norms has consistently supported the idea that enforcement is a necessary condition for private institutions to succeed. Yet, when enforcement passes through sanctions, a free-riding issue is created. While offering a benefit that is shared by all members of the social group, sanctioning presents a cost that is born uniquely by the enforcer. In this paper, we investigate when and why individuals are more likely to sanction norm violations. We focus on a case where sanctions are administered directly by the party that has been harmed by the deviation from the norm. We seek to understand what factors influence the party's propensity to sanction such an offense. We study these issues in the context of gourmet cuisine, a context in which previous research has documented the existence of social norms. We first inform our understanding of social norms and their enforcement mechanisms through exploratory field work. We then use the insights gathered from our qualitative investigation to guide a quantitative examination of norms, by means of a scenario-based experiment that we administered to Italian chefs included in the 2009 edition of the Michelin Guide.

1. Introduction

Recent years have witnessed increasing interest in the role played by private-decentralized institutions, such as social norms, on the behavior of individuals and firms (King and Soule, 2007). The study of social norms has fascinated scholars from a variety of disciplines, ranging from economics (North, 1990; Greif, 1994), to political science (Ostrom, 1990), law (Ellickson, 1991), and sociology (Ingram and Inman, 1996). One feature that is common to all these approaches is the idea that norms need to be enforced in order to function effectively. Because norms often

²⁰The essay is co-authored with Andrew A. King (Dartmouth College) and Gianmario Verona (Bocconi University). The authors acknowledge financial support from the Research Division "Claudio Dematté" of SDA Bocconi School of Management, Bocconi University and the Tuck School of Business at Dartmouth. The authors wish to thank Adam Kleinbaum for his insightful comments on previous versions of the manuscript.

constrain private incentives in the interest of a collective good, they stimulate free-riding. For this reason, Ingram and Clay (2000:538) note that enforcement of norm violations gives “norms their teeth” and Horne (2004:1039) notes “whatever the requirements of a normative rule, if it is not enforced, the norm is not in effect.”

Enforcement of social norms can entail rewards for those who conformed to them or sanctions for those who did not (Oliver, 1980). When sanctions are administered by individual participants themselves, a “second-order” free-riding problem emerges (Coleman, 1990). While offering a benefit that is shared by all members of the social group, sanctioning presents a cost that is born uniquely by the enforcer. Emotional distress, financial burden, and, to the extreme, the threat of physical harm are among the possible costs (Horne, 2004).

In this paper, we investigate when and why individuals are more likely to sanction norm violations. We focus on a case where sanctions are administered directly by the party that has been harmed by the deviation from the norm.²¹ We seek to understand what factors influence this party’s propensity to sanction such an offense.

We conduct our analysis by investigating the operation of norms in gourmet cuisine. Within this context, previous research has documented the existence of social norms regulating the exchange of information among chefs (Fauchart and von Hippel, 2008). These norms have been shown to order the transfer of knowledge about cuisine elements, such as recipes and cooking techniques. In order to advance the theory of normative enforcement we rely on a mix of qualitative and quantitative research (Edmondson and MacManus, 2007). More precisely, we began our research with exploratory field work aimed at getting a better understanding of the functioning of social norms and their enforcement mechanisms. Then we developed a set of testable hypotheses based on qualitative evidence gathered in triangulating

²¹ Literature defines this type of sanctioning as direct or second-party sanctioning, where second-party refers to the individual who was harmed by the violation (Ingram and Clay, 2000).

detailed interviews with industry players, with narratives, observation and documents (Denzin and Lincoln, 1998). Finally, we used the insights gathered from our qualitative investigation to guide a quantitative examination of norms, by means of a scenario-based experiment that we administered to Italian chefs included in the 2009 edition of the Michelin Guide. This mixed empirical approach allows us to develop a better understanding of what influences the incentives for second-parties to engage in direct sanctioning.

Our article is structured as follows. We start with a brief review of existing literature dealing with social norms and their enforcement. Then we introduce our exploratory field work and present emerging results. The following section is dedicated to the description of our quantitative empirical approach, as well as to the presentation of results. We conclude with a discussion of the overall contribution of our paper, its limitations, and the inputs it may offer to future research.

2. Literature Review

According to Nobel Laureate Elinor Ostrom (1990), enforcement is a necessary condition for private institutions to succeed. Literature on social norms has pointed at the existence of two basic types of incentives: sanctions imposed to those who fail to conform or rewards conferred to those who do follow normative rules (Oliver, 1980). A significant literature has documented that sanctions can be particularly effective, and cataloged the use of gossip, admonishment, social ostracism, economic boycott, property destruction, and violence among the others (Rasmusen, 2007). Ingram and Clay (2000) argue that one of the central roles of interpersonal relationships is to “give norms their teeth”. People follow norms “when to do so is justified by a comparison of current and future payoffs for adhering to or violating the norm” (Ullmann-Margalit, 1977).

Norms have been shown to act as a critical lubricant for economic and social exchange. For instance, Greif (1993) shows that the eleventh century Maghribi

Traders' were able to stipulate and enforce effective contracts because of a well-defined system of punishment, based on which merchants refused to interact with those who had cheated in the past. Indeed, they "conditioned future employment on past conduct, practiced community punishment, and ostracized agents who were considered cheaters until they compensated the injured" (Greif, 1993: 530). Similarly, Richman (2006: 384) illustrates that Jewish diamond merchants "rely on a private system that is less costly, more reliable, and thus superior to state-based alternatives. [...] This ability to enforce executory contracts that public courts cannot enforce, and thus that potential industry rivals cannot enforce, propels the Jewish community's success".

Although sanctions can reduce the propensity for actors to free-ride on the collective good, they create a "second-order" free-riding problem (Coleman, 1990). Although they benefit the community as a whole, they are costly to the one who administers them. This free-riding problem is exacerbated when looking at direct sanctioning, i.e. sanctions that are administered directly by the victim of the norm violation. Deviations from social norms can indeed be sanctioned either directly by the party that has been harmed by the deviation (second-party sanctioning) or indirectly by other members of the social group to which the party who has deviated belongs (third-party sanctioning). Second-party sanctioning is particularly costly, since it implies that a single individual bears much of the cost of eliciting compliance to norms, without sharing the burden of punishment with other members of the social group (Piskorski and Gorbatai, 2010). Punishment carries indeed the risks of hostility, retaliation, and decreased exchanges (Blau, 1964).

Thus, sanctions contain a paradox: they are critical to holding social norms in place which prevent free-riding at the expense of the collective good, but they create a second-order free-riding problem. In this paper, we attempt to understand when actors will eschew free-riding and sanction others for non-compliance with norms. In order to advance the theory of normative enforcement, we rely on a mix of

qualitative and quantitative research. Methodological fit of theories that are in an either nascent or intermediate status requires a combination of qualitative and quantitative data indeed (Edmondson and MacManus, 2007). To allow an open exploration of this issue, we first engaged in an explorative field work targeting members of the social group of gourmet cuisine chefs. The next section provides details about our method as well as results of the analysis of qualitative data.

3. Developing the Framework

Gourmet cuisine represents the ideal context for conducting our research, as it displays the existence of social norms regulating the exchange of information among chefs (Fauchart and von Hippel, 2008) - information that would be unprotected otherwise.

Recent years have witnessed an increase in technicality and sophistication of fine dining. For instance, technological innovation has entered the kitchen indeed, thanks, among the other technological developments, to the rise of molecular gastronomy as a strong culinary trend (This, 2006). It is no accident that major molecular gastronomy chefs run some of the best restaurants in the world.²² Despite these major changes, the industry remains characterized by scarce applicability of formal intellectual property rights. As an accomplished chef told us:

We talk about it in conferences, but without success [...] How could you pay copyrights if you can just misplace a leaf on the plate and copyright would not be infringed anymore?

In order to react to this legislative gap and prevent expropriation of innovation, in the form of recipes or cooking techniques, gourmet cuisine has witnessed the emergence of a norm-based system of protection (Fauchart and Von Hippel, 2008). Gourmet chefs have developed a set of social norms that substitute for property rights and allow the transfer of legally unprotected information. Such social norms

²² See: <http://www.theworlds50best.com/page/home.html>. Last access: 12/31/2010.

benefit the community by fostering the exchange of creative ideas. Still single members of the community may have a private incentive to defect and misappropriate information, thus posing the issue of enforcement.

In order to develop a framework explaining normative enforcement, in 2008 and 2009, we conducted a field work targeting top restaurants in Italy and the United States. We conducted detailed, recorded, in-person interviews with chefs from the eight top restaurants in the Milan area and four top restaurants in the Boston area. Later in 2009 and 2010, we also conducted shorter interviews with chefs from 11 additional restaurants in locations throughout Italy and the United States.²³ Characteristics of the informants are described in Table 1.

-Insert Table 1 about here-

Formal interviews covered a variety of topics, ranging from training and cuisine style to social norms and their enforcement. Traditional methodological prescriptions on collecting data through personal interviews were followed (Lee, 1999). The interviews lasted from 45 minutes to 2 hours, and were held at the restaurants in which our informants worked as head chefs. We tape-recorded the interviews and transcribed them. The interviews were semi-structured, following a path of key questions, referring to: (a) the chef's experiences and background; (b) the process of development of a new recipe; (c) the replicability of innovations and the importance of protecting one's innovation; (d) the practices of information transfer among chefs in the industry; and finally (e) expectations about social norms and reliance on punishment.

²³ We identified top restaurants based on the fact that they had received at least one Michelin star. Obtaining a Michelin star is one of the top achievements that a chef can achieve in his career. It is a sign of creativity and quality. In the words of a gastronomy expert, it "ensures that your banker will be kind to you" (Nouvel Observateur, 2005). For the United States, where the coverage of the Michelin Guide is limited to four major cities, we relied on other widely-diffused culinary guides. In particular, restaurants in Boston were selected on the basis of the list of "The 50 Best Restaurants" in Boston published by the Boston Magazine, and based on reviews by the Globe, the Herald, the Phoenix, Zagat, Yelp, the Phantom Gourmet, and select posters from the Boston board on Chowhound (http://www.bostonmagazine.com/restaurants/articles/the_50_best_restaurants/).

We coded interviews using thematic coding. We first completed a short description of each interview to highlight patterns, demographic information on the interviewee, and key points emerged during the interviews. We then detected key categories and similarities across interviews to allow comparisons of the different cases. Following a ladder of analytical abstraction (Miles and Huberman, 1994), we moved from codes, themes, and trends, to the final development of an explanatory framework. Based on these observations, we formed a set of hypotheses that we then test through the use of a quantitative, scenario-based, experiment.

During this process, we triangulated interview data with narratives, observation and documents. More precisely, an investigation of internal documents (e.g. restaurant reports, websites, etc.) and external sources has been employed to provide a sound opportunity for method triangulation and comparison, so to increase confidence in the robustness of our findings (Jick, 1979). All the interviews were conducted by at least two authors to allow triangulation on the investigator side (Patton, 2002). To further confirm our findings, the authors met several times to discuss and resolve potentially diverging interpretations of findings. Member checks were used to test the credibility of our interpretations of the data (Lincoln and Guba, 1985; Hirschman, 1986). Also, we conducted additional shorter interviews of chefs and obtained confirming evidence. Thus, we believe that we achieved theoretical saturation (Eisenhardt, 1989).

3. 1. Information Sharing and Social Norms

All our informants reported participating in information sharing with other chefs. Sometimes this sharing occurred at common gatherings, but more often it occurred in a bilateral manner. In the words of one of our informants:

If you get chefs together, they have nothing else to talk about but food. So they are going to share [ideas].

Chefs also reported initiating exchanges with others. One famous chef in the US reported:

I am not very good at pasta. This is my Achilles heel. I cannot make pasta very well. I call my friend, who makes the best pasta I know in town. And, you know, she is, "What do you mean you cannot make pasta? I have shown you like so many times." And she will get out her bag of tricks and tell them to me.

A common way to initiate interactions is for chefs to eat in their colleagues' restaurants:

Big names have a good percentage of customers who are colleagues. One goes there to understand, to see, to taste what others are doing

Independently on how it gets initiated, information sharing usually involves recipes, techniques, as well as how to apply a certain technique in order to obtain a specific result:

What you ask to colleague is how to get a certain result with a specific technique. For example, if I taste a dish of yours and see that you were able to prepare particularly soft foam, I would ask you how you were able to do that.

Chefs recognize that they need these exchanges because their creativity heavily relies on external stimuli. In the words of one of our informants:

We take bits and pieces from people and things that we have learned, and things that we have read, and things that we have studied, and we apply them to what we do.

Still, all of the informants noted the existence of norms which protect the information that is transferred in such exchanges. Consistent with previous accounts (Fauchart and von Hippel, 2008), we found that information exchange is made possible by the existence of a precise set of norms. As members of a social group,

gourmet chefs have developed their own social norms. Our informants describe them as “unwritten laws” or “mental copyrights”:

If they want to put my octopus on their menu I cannot stop them. But I think it would be too bad. It is like a mental copyright more than anything else.

The most basic social norm regards copying. In the words of one of our informants:

Cooking the recipe of another chef is like taking Correggio [a famous Renaissance painter] and making a copy: no matter what, it will always be a knockoff.

Overall, our interviews confirm previous research by Fauchart and von Hippel (2008) that highlighted how the transfer of culinary knowledge is regulated by three basic social norms – namely, “don’t copy exactly”, “cite the source”, and “don’t pass on”. Appendix 1 reports some evidence gathered with respect to these three norms, such as an example from one of our interviews and the conditions under which they are expected to be used.

3.2. Social Norms and Punishment: A Paradox

Our interviews, however, revealed a paradox with respect to the use and maintenance of norms. All of the chefs reported the existence of the norms described earlier – often in a very standardized way (see Appendix 1). Still, they also reported that they perceived there to be a substantial cost to norm violation (see Table 2). Interestingly, almost all of the chefs reported that violation of the norms would be harmful, but for most the harm was vaguely expressed (e.g. “*You never want to burn any bridges in the industry*”). This sense of penalty was not corroborated by their reports of their own propensity to sanction. The majority of respondents reported that they would not sanction others if they violated a norm (see Table 3). Only four of twelve chefs we interviewed in detail reported that they personally

sanctioned others for non-compliance with norms. Two of these four however reported doubt that they would sanction at other times during the interview.

-Insert Tables 2 and 3 about here-

Thus, our interviews uncovered a fundamental paradox. Chefs simultaneously fear being penalized for norm violation and yet report that they would not actually sanction other chefs for doing so. What might explain this contradiction? To better uncover attitudes toward sanction and to uncover the conditions when it might occur, we conducted additional analysis.

3.2.1. Attitudes toward Sanctioning. Several of our informants explained their unwillingness to sanction by noting that sanctions are costly to the enforcer. Paradoxically, sanctioning – although in the community’s interest – can negatively affect the reputation of the sanctioner. When second-party sanctioning is administered, the punisher, rather than the deviator, may be perceived negatively. Concern with copying may imply a lack of creativity on the part of the sanctioner. A chef who is truly creative should be able to move on and create new designs and so keep one step ahead of his/her imitators. In other words, the cost of misappropriation should be lower for the truly creative, and an evident concern with copying may reveal a lack of imagination. Moreover, an inspired chef is expected to be able to make his cuisine style unique and recognizable, so that customers would be able to detect the copy.

The act of punishment can also be interpreted as an indication of the chef’s character. Although chefs who sanction are acting in the community’s interest by helping to maintain a valuable norm, their behavior was often reported in a condescending manner by observers. Female chefs, for example, would often sardonically suggest that sanctioning chefs were more likely to be male. Others would express the belief that sanctioning was more common among those with a weak character. In particular, sanctions were associated with immaturity.

[Punishment] is subjective. It depends on the way you are. I would tend to let it go, but there are others who get mad... In my opinion, it depends also a lot on how "mature" you are.

The four chefs that did report that they would sanction often seemed defensive about their behavior. In particular two of them went into long justifications of their actions, as if they felt it was intrinsically bad to react to misbehavior. This puzzling situation may be a product of the belief we described above, according to which a concern with copying may be indicative of a lack of creativity. For this reason, punishing chefs felt they needed to justify their actions:

Why do I care? Well, we have pride, we do care. I do not need people stroking me but I do want to get credit for...I mean, I work 110 hours a week. I make so many sacrifices. I would not know what to do with myself if I did not do what I did. At the end of the day, I go home and I take the time to look my wife in the eye and my baby in his eye and myself in the mirror.

3.2.2. Conditions for Sanctioning. In our interviews, we tried to identify conditions that would make chefs more likely to punish others for norm violation. The four chefs who reported a willingness to sanction provided greater detail on the conditions. Four others also provided some details when pressed to explain any conditions that might lead to punishment.

One issue that emerged frequently was the visibility of the violation to the community at large. According to our informants, if other members of the social groups can easily spot the violation, they would be more likely to punish. Peer visibility reduces the cost of sanctioning by limiting or reducing the risk that the sanctioner's claims are not believed. Our informants suggested that when paternity can clearly be attributed, everyone can clearly detect ongoing violations, thus making sanctioning legitimate. In the words of our informants:

If I use something, I am probably going to give someone some credit. I think everyone is very careful with that. When people are not careful with that, it

comes back to them, whether the chef happens to walk in the restaurant and see it or someone tells them about it, "Hey, someone has got this on their menu over there." You know, it is a small world. [...]Everyone knows what everyone is doing.

A second factor that chefs reported as influencing sanctioning is the severity of the violation. Our informants reported higher willingness to sanction when they feel they have been deeply damaged by the violation. According to our informants, this may be the case because the violator is in direct competition with the victim of the norm violation:

If we had someone here located at a distance of 100 meters cooking the same things that we cook here, with the same style...well, that would be problematic.

This may also be the case of violations that do not involve a single dish, but are more extended than that. In the words of one of our informants:

[A chef] copied half my menu. I did not see the food on the plate. I was just reading it [in a food magazine], I was like whoa. It is nice that you are looking at my website and all but come on. So I sent him a pretty terse letter after that.

Our chefs reported that they felt sanctioning was illegitimate when the cost of violation is small. Two informants told us that it is not fair to punish a violator if he is not replicating the dish to the detriment of the second-party (namely, he is not a professional chef and is not cooking for profit). In such case, one of the informants pointed out, the enforcer would end up being perceived as jealous rather than as fairly enforcing social norms.

A third factor that chefs reported as influencing sanctioning is the reputation of the violator. Our interviews revealed some form of reverential fear in front of reputed players.

You can really see the difference in reputation among chefs. When [a top chef] is around everyone changes approach, while with [less reputed chefs] everyone is more relaxed.

In other words, engaging in direct punishment of a highly-reputed industry member may be extremely costly. Our informants talked of a fear of ostracism from the community of reference in case of any action targeted at them. Consider for instance this account, in which one of our informants clearly states that, despite a top chef infringing the social norms by copying one of his dishes, he would have not sanctioned him because of his reputation:

The idea of this dish of mine was "used" by [a famous chef], and that was a little bit annoying because, in my perspective, such an important chef should not copy dishes in such an open way. [Interviewer: If he would ask you today for another recipe to insert in his menu?] I would be glad to pass it to him. [Interviewer: Despite he did not recognize your paternity on that dish he copied?] Yes. You know, he is [a name in the industry].

A fourth and final factor influencing sanctioning it related to the existence of an exchange relationship with the violator. Our interviews revealed an intense activity of sharing of supplies, labor, and emergency help among chefs. Such activity seems to be fundamental for competing in the restaurant business:

I think we are pretty good about sharing help. Every place I have been, every city I have ever worked in, people have been very good about that. People know that they run out of stuff sometimes and they want to be able to come back to you.

As such, chefs want to preserve their ability to engage in such exchanges. In other words, the existence of an ongoing relationship of mutual benefit is sometimes a good enough reason to avoid sanctioning.

You never want to burn any bridges in the industry because you might need something. You might need some dinner napkins at the last minute because

you are running low. Or you might need five pounds of swordfish. Or you might need a busboy really badly. Hence it is never good, I think, to burn bridges.

Wrapping up, insights from our qualitative examination seem to suggest that, despite direct sanctioning is rarely used by gourmet chefs, it is most critical under some conditions. It is bolstered when the violations are visible and severe. It is hampered when the violator is highly reputed or partner in an exchange relationship. We summarize findings about these conditions showing excerpts from our interviews in Table 4.

-Insert Table 4 about here-

3.3. The Emerging Framework

Results of our qualitative investigation suggest that direct sanctioning entails a high cost. Chefs who sanction may be perceived as immature, or not sufficiently creative. As a result, chefs who are willing to enforce norms through direct sanctioning feel the need to justify such behavior, as if they were afraid that their concern with copying could have been considered indicative of a lack of creativity. Sanctioning seems to be rare in practice.

However, a second main finding of our qualitative examination is that there do seem to be some conditions that allow chefs to overcome the cost that is attached to sanctioning. Two of these conditions confirm previous research. Two suggest extensions to existing theory. The two expected conditions relate to the severity of violations and the reputation of the violator. As per the former, obviously serious violations are more likely to be sanctioned. Literature argues that in these cases the high costs associated to sanctioning could be somehow compensated by the fact that the party administering the sanction has been harmed by the violation (Piskorski and Gorbatai, 2010). The more severe the violation, the higher the legitimization and, so to say, the ease of punishment.

Also, it should come as no surprise the fact that members of a social group are less likely to sanction more reputed players. Previous research has shown that reputation is indeed fundamental in the context of gourmet cuisine. For instance, Rao, Monin, and Durand, (2003) show that the reputation of chefs abandoning classical cuisine for nouvelle cuisine had a major role in leading French elite chefs to abandon classical cuisine and embrace the nouvelle cuisine movement. Highly reputed players are indeed perceived as role models, thus exerting a strong power on their peers (Podolny, 1993). Given the role of reputation in the industry, engaging in direct punishment of a highly reputed industry member may be extremely costly, as it can lead to the extreme of ostracism from the community itself.

The two unexpected conditions relate to the visibility of the violation and the effect of an existing exchange relationship with the violator. We were indeed surprised to see that the visibility of the violation to other members of the social group ultimately increases the harmed individual's willingness to sanction. One might have expected that sanctions by third parties would substitute for and reduce the need for bi-lateral sanctions. One could even argue that there should be no need for bi-lateral sanctions when a violation can be detected by other members of the social group, because the reputational effect of the violation already attaches. But, according to our informants, peer visibility limits the risk of misattribution of the deviating behavior. Our informants suggested that when paternity can clearly be attributed, everyone can detect ongoing violations, thus making sanctioning legitimate. Our informants suggested that visibility of deviations facilitates the sanctioning process by "authorizing" a chef to complain.

Another striking result is that chefs report a lower willingness to sanction when in an exchange relationship with the violator. One might have expected that such exchange would make it easier to effectively sanction the offender. Indeed, political scientists argue that trade facilitates the working of international law by allowing dependency which makes sanctions more effect. In economics, the

existence of an ongoing relationship creates the basis for relational contracts in which one transfer is expected to lead to the next and so on (Baker, Gibbons, and Murphy, 2002). Such contracts regulate repeated exchanges through a system of tit-for-tat enforcement: the value of continuing exchanges is lost at the first instance of defection (Gibbons, 2003; 2005). According to this argument, sanctioning should be immediate when the violation comes from an exchange partner. Despite this counterargument, our informants seemed to suggest that the value of physical exchanges is too high for them: such exchanges can happen only among few proximate restaurants, thus creating the need to somehow close an eye over misbehavior coming from those firms.

In total, our qualitative results suggested four hypotheses:

H1: The higher the severity of a norm violation, the higher the willingness to engage in second-party sanctioning.

H2: The higher the reputation of the party violating the norm, the lower the willingness to engage in second-party sanctioning.

H3: The higher the visibility of a norm violation to other members of the social group, the higher the willingness to engage in second-party sanctioning.

H4: The existence of an exchange relationship between the second-party and the party violating the norm reduces the willingness to engage in second-party sanctioning.

4. Testing the Framework

Testing the operation of norms, particularly the propensity to sanction, is extremely difficult. Simple surveys of chef attitudes are subject to a host of problems caused by endogeneity and respondent bias. The detailed measurement of attitudes and behavior makes archival analysis problematic. Laboratory experiments remove the actors from some of the conditions which support the norms. To overcome these problems, we decided to conduct a scenario-based experiment (Florey and Harrison,

2000; Gomez, Kirkman, and Shapiro, 2000) with real industry players – in this case Italian high-end chefs.

We designed our experiment to test our hypotheses of the four factors that influence the propensity for bi-lateral sanctioning. We also created questions to evaluate the propensity to sanction under different circumstances, and tested these questions with top chefs and in a pilot survey. We explain these tests in more detail when describing our procedure. To help rule out the potential for endogeneity to bias our results, we administered the experimental treatments randomly to our chefs. We also asked them to respond to two different scenarios – thereby allowing us to evaluate how their responses changed with different stimuli. The administration of two scenarios per respondents also allowed us to control for individual characteristics, and isolate this confounding component from the results of our analyses. We explain how we try to tackle this issue when describing our model specifications.

In the next section, we discuss details of our experimental examination (participants, procedure, design, measures) and tools we relied on for analyzing the collected data (model specifications).

4.1. Sample

To identify high-end chefs, we relied on the Michelin Guide, the most reputed rating agency in the context of gourmet cuisine (Ferguson, 1998). Restaurants are selected into the Michelin Guide if they satisfy a minimum standard of quality. Once they enter the guide, restaurants are rated based on “forks” assessing the “décor, ambience and service” on a five-point scale. A small percentage of restaurants in the Guide are also awarded “stars”, evaluating culinary excellence on a three-point scale. The 2009 Italian edition of the Michelin Guide included 2,529 restaurants, among which 275 were awarded stars (respectively 236, 34, and 5 for each category from one to three stars). Our population consists of these 2,529 restaurants, which we

contacted to take part of our scenario-based experiment administered through a survey. Our response rate was equal to 21.1 percent, with 534 over 2,529 surveys returned. Our respondents were mainly male (82 percent) restaurant owners (78 percent) in a range of different ages (46 years old on average, with a minimum of 23 and a maximum of 80 years), some of whom were awarded stars (respectively 74, 16, and 2 for each category from one to three stars).²⁴ As shown in Table 5, restaurants in our sample tend to be significantly more expensive and better rated compared to the average restaurants included in the Michelin guide. Given the large size of the sample, however, we also report effect sizes (Cohen's *d*). The values are inferior to 0.5 in all cases, showing that the differences between respondents and nonrespondents are relatively small, although significant (as shown by the *p*-values). Thus, our sample provides enough overlap with the population to provide representative results.

-Insert Table 5 about here-

4.2. Procedure

We contacted the head chef of each restaurant in our population of interest via mail. In the cover letter, we briefly explained our study. Also, we provided each chef with a physical survey or a password to access a dedicated website on which they could have completed the survey online.²⁵ Before sending out the survey, we called each of our potential respondents in order to announce the questionnaire, and briefly explain how important their feedback was for us.

The survey was divided into two parts, corresponding to the two different scenarios. Indeed, each respondent was assigned two scenarios describing a

²⁴ Please note that we effect coded the variables indicating gender (*male*) and ownership (*owner*). Hence, when looking at the descriptive statistics displayed in Table 8, the mean captures the mean between the values of -1 and +1 (and not the percentage of cases).

²⁵ Note that 94 percent of respondents returned two scenarios and the remaining 6 percent returned from one to six scenarios (having completed the survey both off-line and online), for a total of 1,030 scenarios for 502 completed surveys.

potential restaurant with which he or she might happen to interact. An identical set of questions about norms and punishment followed each description. Finally, we asked our respondents to provide information on some characteristics of the individual chef and of his or her restaurant, which we use as control variables in our analysis.

Both the scenarios and the questions used in our survey were informed by the qualitative phase of our project. We first designed the scenario-based experiment based on the insights gathered during the formal and informal interviews with industry players. Then we asked some of our informants to examine the scenario and the survey, in order to assess its face validity. Finally, we ran a pretest of our scenario-based experiment on a sample of 224 restaurants that were not included in the sample.

The scenarios consist in a short description of the characteristics of the imagined restaurant itself and of its head chef (see Figure 1). The four characteristics that are included in the scenario constitute our experimental manipulations. More details about the manipulations are provided below.

-Insert Figure 1 about here-

4.3. Variables and Measures

4.3.1. *Dependent Variable.* We measure *second-party sanctioning* as the likelihood, measured on three seven-point Likert scales, that a chef would sanction a violation of commonly accepted norms. We used social norms that matched those described by Fauchart and von Hippel (2008) and that we had confirmed in our interviews. We then asked the surveyed chef whether they would engage in any of three types of sanctioning behavior: 1) negative gossiping within the community, 2) refusal of future requests for help, and 3) refusal of future requests for information. In the results reported in this article, we use the average value of these three

measures. The sign and significance of our reported results do not vary if the three items are entered separately into our model.

4.3.2. Independent Variables. Our four independent variables are the *peer visibility* of deviations, the severity of the violation (*direct competition*), the *reputation* of the violator, and the *exchange relationship* between the punisher and the violator. Visibility and exchange relationship are measured variables, whereas severity and reputation are manipulated in the scenario.

Hypothesis 1 predicts the positive effect of the severity of a norm violation on the willingness to engage in second-party sanctioning. According to our informants, the severity of a norm violation depends on the fact that it has been committed by a player which is in direct competition with the second-party. In this respect, our informants clearly pointed at two issues: geographical proximity and similarity in style (*"If we had someone here located at a distance of 100 meters cooking the same things that we cook here, with the same style...well, that would be problematic"*). We hence measure *direct competition* based on two variables, geographical proximity and similarity of positioning, which we manipulate in the scenario. This is consistent with previous accounts in the hospitality industry (Baum and Mezias, 1992). We manipulated geographical proximity by describing the restaurant as either "physically very close to your restaurant" (high geographical proximity) or "physically very distant from your restaurant" (low geographical proximity). Following recommendations from our informants, we did not insert any reference point (such as 5 miles away or within the same block) to avoid any subjectivity in the interpretation. Since our treatment is a concrete statement of fact, no manipulation check was needed (Perdue and Summers, 1986). We manipulated product positioning by describing the restaurant as either "cuisine style and ambience similar to your restaurant" (high product positioning) or "cuisine style and ambience very different from your restaurant" (low product positioning). We performed the manipulation check by asking respondents to evaluate, on a seven-

point Likert scale, to what extent the restaurant described in the scenario was comparable to their own restaurants in terms of positioning. The manipulation was successful ($F(1,1063)=8.43$, $p=0.00$). We aggregate the two manipulations into the variable we call *direct competition* which is equal to the sum of the two. Our results are consistent if the two manipulations are entered separately into our model.

Hypothesis 2 predicts the negative effect of the reputation of the party violating the norm on the willingness to engage in second-party sanctioning. We manipulate *reputation* in the scenario by describing the restaurant as either “Zagalin cuisine rating 28. Comments: creative, innovative, unique style. Chef has 20 years of experience in the industry” (high reputation) or “Zagalin cuisine rating 20. Comments: lacks imagination, unoriginal, ordinary style. Chef has 1 year of experience in the industry” (low reputation). We explained the Zagalin (a fictional name) rating as equivalent to a Zagat™ rating from 0 to 30. We performed the manipulation check by asking respondents to evaluate, on a 7-point Likert scale, to what extent the chef described in the scenario was likely to be considered highly prestigious by colleagues. The manipulation was successful ($F(1,1060)=9.07$, $p=0.00$)).

Hypothesis 3 predicts the positive effect of the visibility of a norm violation on other members of the social group on the willingness to engage in second-party sanctioning. We measure *peer visibility* as the likelihood, measured on a seven-point Likert scale, that in case of deviations from expected behavior, our survey chef expected that the deviant behavior would be noticed by other chefs.

Finally, hypothesis 4 predicts the negative effect of the exchange relationship between the second-party and the party violating the norm on the willingness to engage in second-party sanctioning. We measure *exchange relationship* as the likelihood, measured on a seven-point Likert scale, that our respondent believes he/she would engage in exchange of material favors in the following year (e.g.

exchange missing ingredients or loan personnel) with the chef described in the scenario.

Visibility to peers and exchange relationship are measured variables because they could not be treated without losing the realism and comprehensibility of our scenario. Fortunately, our use of two surveys per subject helps prevent confound with personal attributes because we identify the effect by comparing within-subject changes in the independent and dependent variables. In addition, to correct for an attribute of visibility that might change with *peer visibility*, we controlled for general visibility, which we manipulated with *frequency of review*. We manipulated *frequency of review* by describing the restaurant as either “frequently reviewed by local media and customers (among the restaurants with more reviews)” (high frequency review) or “rarely reviewed by local media and customers (among the restaurants with fewer reviews)” (low frequency of review). We avoided inserting any reference point (such as among the 5 percent top reviewed restaurant) at the advice of chefs with which we piloted the survey design. As a consequence, since our treatment is a concrete statement of fact, no manipulation check was needed (Perdue and Summers, 1986). Our experimental design is hence a 2 (geographical proximity) x 2 (product positioning) x 2 (reputation) x 2 (frequency of review) mixed design, combining within- and between-subject assignment: each respondent was randomly assigned two of the sixteen alternative combinations of the four manipulations. The four manipulations are summarized described in Table 6.

-Insert Table 6 about here-

When we conducted subject-pooled analyses of our data, and thus could not use subject fixed effects, we also included several important control variables. These included position in the organization (*owner*), gender (*male*), years of experience in the industry (*experience*), affiliation to a chain (*chain*), and reputation as measured by presence of Michelin stars (*reputation*). Finally, when asking about second-party sanctioning, we distinguished among cases of violations of norms when transferring

three types of knowledge - specifically, recipes, recipes of signature dishes, and cooking techniques.²⁶ We marked the three different types of information with dummy variables and combined the three reports of punishment (recipes, signature dishes, techniques) into one database. By construction, this raises the number of observations threefold. The dummies *signature dish* and *technique* are inserted as controls in our analysis. A comprehensive list of the variables, together with their measures and operationalization, is shown in Table 7. Descriptive statistics and correlations are shown in Table 8.

-Insert Tables 7 and 8 about here-

4.4. Model Specification

We use both fixed- and random-effects regression analysis to test our hypotheses. The joint reliance on a randomized experimental design and on two scenarios per respondent allows us to control for subject-unobservable attributes. In particular, the presence of two scenarios per respondent allows us to use fixed effects (Hausman, Hall, and Griliches, 1984). Introducing fixed effects for each respondent, our coefficient estimations are based on the different stimulations created by the two scenarios.

In order to observe the potential effect of control variables at the respondent level, we also ran random-effects specifications. For random-effects models to be consistent, the random error associated with each subject must not be correlated with other regressors. We test this assumption using Hausman's (1978) test. We report results for random effects, as well as results of the test, for all our models. Random-effects models are hence reported also for those cases in which the Hausman test was not passed. In this way, we can observe the effect of fixed

²⁶ A signature dish is a dish that uniquely identifies a chef and is commonly associated with her or his cuisine. Even if the menu is changed frequently, these dishes are always present, as they represent their inventors' artistry, style, and approach to cuisine.

subject attributes at the individual level (e.g., gender, or ownership) even if we are more circumspect in the inferences we make.

4.5. Opening the Black Box of Second-Party Sanctioning

Our quantitative inquiry aims at answering two main questions. First, we are interested in understanding whether or not sanctioning is likely to be administered by members of a social group in case of deviation from a social norm. Second, we are interested in understanding whether sanctioning is dependent on the factors we identified through our qualitative inquiry. We next present the results of our analysis.

4.5.1. Are sanctions likely to be administered? Consistent with the results of our qualitative study, chefs in our sample expressed a reluctance to engage in second-party sanctioning. When asked about their willingness to punish deviations from social norms, the average willingness reported by our respondents was 3.22 out of 7 (with a standard deviation of 1.80). As reported in Table 9, of the chefs in our sample, only 25.7% report a willingness to punish above the median value of our scale (4). On the contrary, 60.1% of our respondents report a willingness to punish below the median value of our scale (4). Only 6.1% of our respondents provided a positive extreme answer (7), whereas 22.0% of our sample provided a negative extreme answer (1).

-Insert Table 9 about here-

4.5.2. When are sanctions more likely? We attempt to answer this question through the analyses reported in Table 10. Odd models are fixed-effect OLS regressions, while even models are random-effects GLS regressions. We entered each of the four independent variables individually, and then we inserted all of them into one single regression (models 9 and 10).

-Insert Table 10 about here-

Hypothesis 1 predicts the positive effect of the severity of a norm violation on the willingness to engage in second-party sanctioning. Our results strongly support

this hypothesis, as shown by the positive and significant coefficient of *direct competition* across all specifications.

Hypothesis 2 predicts the negative effect of the reputation of the party violating the norm on the willingness to engage in second-party sanctioning. Our results strongly support this hypothesis, as shown by the negative and significant coefficient of *reputation* across all specifications. Note that the coefficient loses its significance in the complete random-effects model (model 10). Since we do not pass the Hausman test for the use of a random effects model in this case, the coefficient estimates in this model should be interpreted with caution.

Hypothesis 3 predicts the positive effect of the visibility of a norm violation to other members of the social group on the willingness to engage in second-party sanctioning. Our results strongly support this hypothesis, as shown by the positive and significant coefficient of *peer visibility* across all specifications.

Finally, hypothesis 4 predicts the negative effect of the exchange relationship between the second-party and the party violating the norm on the willingness to engage in second-party sanctioning. Our results strongly support this hypothesis, as shown by the negative and significant coefficient of *exchange relationship* across all specifications.

In summary, our results suggest that the likelihood of direct sanctioning increases with the visibility and severity of the violation, and decreases with the reputation of the violator, as well as with the existence of an exchange relationship between the second-party and the violator.

5. Discussion and Conclusion

Literature on social norms has consistently supported the idea that norms need to be enforced in order to be effective. In this paper, we focus on the case of enforcement through sanctions administered directly by the party that has been harmed by the deviation. We are interested in understanding when and if direct sanctions are

actually used to enforce social norms. Also, we aim at understanding what may increase the costs and the benefits associated with this type of sanctioning, thus influencing the willingness to use it to elicit compliance to social norms.

In conformity to the findings from our interviews, our quantitative analysis shows that sanctions are reluctantly used. Moreover, results of our scenario-based experiment support the findings from our qualitative data with respect to the four factors that bolster or hamper reliance on this rare form of sanctioning.

It comes as little surprise that more serious violations are more likely to be sanctioned, while violations coming from reputed players are less likely to be sanctioned. However, we believe our other two findings are both unexpected and fascinating. First, we observe that violations that are expected to be more visible to peers are more likely to be sanctioned. This is surprising since it would have been reasonable to expect that third-party sanctions would substitute for second-party sanctions. If violations can be detected by third parties, some of the punishment has been already attached to the violation. At the extreme, peer visibility should eliminate the need for bilateral sanctions. Our qualitative interviews help with interpretation of these results. Chefs reported that peer visibility limits the risk of misattribution of the deviating behavior, thus making sanctioning legitimate. Our informants suggested that when paternity can clearly be attributed, everyone can detect ongoing violations. This enhanced ability to attribute violations would facilitate sanctioning, by making a chef feel somehow authorized to complain in front of his or her peers.

Second, we observe that violations coming from exchange partners are less likely to be sanctioned. This finding challenges the idea that relational contracts are based on a system of tit-for-tat enforcement. The existence of ongoing exchanges should facilitate the enforcement of norms, by making the threat of sanctions more costly. In a normal tit-for-tat exchange, regardless of the value of future exchange, violations should be punished following a defection (Gibbons, 2003; 2005). In

contrast, our evidence suggests that punishment seems to follow a different logic in our empirical context. Chefs avoid sanctioning those with whom the value of future exchange is greater. Once again our interviews provide us with the lens through which we can interpret this result: physical exchanges are too valuable for restaurants not to close an eye over misbehavior by exchange partners. Exchanges can happen with a limited amount of restaurants. Indeed, by definition, they are limited to proximate restaurants. Closing an eye over misbehavior may be the only way to go under these conditions of “partners’ scarcity”, thus forcing chefs to make the best of a bad situation. Chefs seem to believe that sanctions will annoy partners without sufficiently motivating them to behave better in the future.

We believe our study makes three main theoretical contributions. First of all, it uncovers the conditions under which second-parties are more or less willing to engage in direct sanctioning. By doing so, we show that the effect of sanctions is contextual, as it can be influenced by the characteristics of the violation as well as of the counterparts involved in the violation.

Second, we find that community visibility actually reinforces the propensity to sanction. This is important because it suggests the potential for greater variance in the effectiveness of norms, depending on the variance of visibility. To the extent to which norm violations are visible to peers is dependent on geography and other local institutions, this finding suggests the potential for a regional effect of norms. For instance, one could expect that dense areas, such as geographical clusters, may increase visibility and social monitoring, thus ultimately strengthening adherence to social norms and increasing the transfer of knowledge across co-located firms.

Third, we believe that our finding with respect to exchange partners is provocative. On one side our qualitative data suggest that when two players are connected by an exchange relationship, they are not expected to defect from social norms, since they expect such behavior to harm this relationship. Yet, chefs in fact report a *lower* willingness to sanction when in an exchange relationship with the

violator. If the commitment to punishment is reduced among parties in an exchange relationship, what holds the norm in place for these players? One possibility is that a single deviation may be tolerated in the interest of the exchange relationship, but repeated violations require strong and direct intervention. We plan to explore whether this is the case in future studies.

From a methodological standpoint, our study also presents some elements of interest for scholars studying the functioning of social norms. The use of a mixed-method approach allows us to couple the richness of qualitative investigation with the precision of quantitative data. Methodological fit of theories that are in an either nascent or intermediate status requires a combination of qualitative and quantitative data indeed (Edmondson and MacManus, 2007). In this respect we first openly explored normative enforcement through an explorative field work, and then tested the emerging framework by means of a scenario-based experiment.

The use of an experimental treatment allows us to more precisely identify the mechanisms at work. Testing the propensity to sanction may be extremely difficult, if one wants to avoid problems caused by endogeneity and respondent bias, but still is interested in detailed measurement of attitudes. Experiments allowed us to balance this trade-off. Moreover, to allow both precision and real-world fidelity, we couple an experimental design with a large-scale study of real industry players. A laboratory experiment would have in fact removed the actors from some of the conditions which support the norms.

Our study contains several limitations. First of all, we measure intended rather than real action. Despite being consistent with our hypotheses, endogenous to our method, and supported by qualitative evidence, this limitation hampers the generalizability of our findings. Second, our models explain a minority of the variance for the willingness to engage in second-party sanctioning. It is however worth noticing that we report within variance, i.e. the variance that is explained by comparing the two scenarios that were assigned to each single chef. Finally, our

investigation is limited to one single industry with its specific set of social norms, thus hampering the generalizability of our results to other industrial contexts.

What does our study suggest for future research? First, our finding about the scarce use of direct sanctions should trigger further research on what holds social norms in place. This is indeed the ultimate question of the functioning of social norms. Given the centrality of this question, further research is needed in this domain. For instance, one may argue that the concurrent availability of other enforcement mechanisms, such as third-party sanctioning, can allow the harmed parties to adopt the one that better matches a cost-benefit analysis, thus explaining scarce reliance on second-party sanctioning. A more profound comprehension of such calculative behavior could definitely favor a better understanding of norms as well as of what holds them in place.

Second, despite second-party sanctioning is rarely used as a mechanism for norm enforcement, more work is needed to better untangle other determinants of this form of punishment. We have indeed identified a series of factors that influence the willingness to rely on second-party sanctioning, thus showing that this form of punishment is contextual on characteristics of both the violation and the violator. A deeper comprehension of what these characteristics are may further improve our understanding of norm enforcement.

Finally, our study highlights the benefits to research that is positioned at the intersection of different approaches and theoretical lenses. Social norms is an exemplar case in this respect since they have been central to a variety of literatures, and over time their understanding has been enriched by the different contributions of these theoretical streams, giving rise to a vibrant debate.

In conclusion, our study disentangles the forces that bolster and undermine the use of direct sanctions as a means for enforcing social norms. We show that the logic of “an eye for an eye” prevails in case deviations are visible to peers and present particularly severe consequences. On the contrary, what we name the “live

and let live" approach prevails when there is an exchange relationship between the second-party and the party violating the norm, or with the reputation of the party violating the norm. Second-party sanctioning is not an easy way to approach norm enforcement. Rather it has been described as an extreme measure. Still, it is a powerful mechanism for explaining the formation and survival of private-decentralized institutions. And we show it can be influenced by contextual and individual characteristics.

TABLE 1.
Characteristics of Qualitative Informants

Informant	Location	Quality	Interviews
<i>Formal Interviews</i>			
Informant # 1	Italy, Urban area	Michelin: 2 stars	One interview, Feb 09
Informant # 2	Italy, Urban area	Michelin: 2 stars	Two interviews, Jan 09 – May 09
Informant # 3	Italy, Urban area	Michelin: 1 star	Two interviews, Feb 09 – Mar 09
Informant # 4	Italy, Urban area	Michelin: 1 star	Two interviews, Jan 09 – Mar 09
Informant # 5	Italy, Urban area	Michelin: 1 star	Two interviews, Feb 09 – Mar 09
Informant # 6	Italy, Urban area	Michelin: 2 stars	One interview, Jan 09
Informant # 7	Italy, Urban area	Michelin: 2 stars	One interview, Dec 08
Informant # 8	Italy, Rural area	Michelin: 1 star	One interview, Apr 09
Informant # 9	US, Urban area	Zagat: 27 (food)	One interview, Feb 09
Informant # 10	US, Urban area	Zagat: 28 (food)	Two interviews, Feb 09 – Apr 09
Informant # 11	US, Urban area	Zagat: 26 (food)	One interview, Feb 09
Informant # 12	US, Rural area	Zagat: n.a.	One interview, Feb 09
<i>Informal Interviews</i>			
Informant # 1	Italy, Rural area	Michelin: 1 fork	One interview, Jan 09
Informant # 2	Italy, Urban area	Michelin: 1 fork	One interview, Mar 09
Informant # 3	Italy, Urban area	Michelin: 1 fork	One interview, Dec 09
Informant # 4	Italy, Urban area	Michelin: 1 star	One interview, Sept 10
Informant # 5	Italy, Rural area	Michelin: 2 stars	One interview, Sept 10
Informant # 6	Italy, Rural area	Michelin: 1 star	One interview, Sept 10
Informant # 7	US, Urban area	Zagat: 27 (food)	One interview: Aug 09
Informant # 8	US, Urban area	Zagat: 28 (food)	One Interview: Oct 09
Informant # 9	US, Rural area	Zagat: n.a.	One Interview: June 10
Informant # 10	US, Urban area	Zagat: 27 (food)	One Interview: July 10
Informant # 11	US, Urban area	Zagat: 26 (food)	One Interview: Sept 10

TABLE 2.
The Costs of Violation

Cost of violation	Example Comment	Boundary Condition	Reported by
<i>Direct Costs (in the relationship with the victim)</i>			
1) Interruption of information exchange	If a chef I do not know calls me and asks me for a recipe, I would tell him: please, put my name on the menu. If he does not do it, then I would not give any more recipes to him in the future.	Depending on the chef	Informant # 7
2) Negative gossiping	You might say to somebody who has worked for you for three years is thinking about going to work for that guy. You might say, I would not recommend you go there. And that is not a restaurant I would recommend you go and I do not think you will learn what you want to learn because the chef just copies. I think eventually everything like that catches up with you. I think if you are not authentic and true to what you are doing, eventually the world knows.	Depending on the chef	Informant # 11
3) Regret	[A chef] copied half my menu. I did not see the food on the plate. I was just reading it, I was like whoa. It is nice that you are looking at my website and all but come on. So I sent him a pretty terse letter after that.	Depending on the chef	Informant # 9
<i>Indirect Costs (in the community as a whole)</i>			
1) Loss of reputation among chefs	A chef would not follow one of my recipes exactly and then serve it in their restaurant because eventually you are found out and people will say, "You know, this is crazy, you know, Joe the chef in Cambridge is serving the same dish that he learned how to cook over at Bob the Chef's over in Boston." You know, everybody knows where he got that idea and it really belongs to Bob the Chef. Chefs would know it. Customers may not. But the press would know. This affects professional standing.	If the violation is detected	Informant # 3; Informant # 11.
2) Loss of reputation among customers	I would hope that they would not basically copy me. But even if they did, I am not even worried about that. Because customers are pretty astute to what the original is and what the copy is. And if the copy does it better than I, then that is my fault.	If the copy is easy to detect	Informant # 7; Informant # 8; Informant # 12.
3) Loss of exchange opportunities	You never want to burn any bridges in the industry because you might need something. You might need some dinner napkins at the last minute because you are running low. Or you might need five pounds of swordfish. Or you might need a busboy really badly. Hence it is never good, I think, to burn bridges.	If restaurants are closely located	Informant # 10.

TABLE 3.
Reported Attitudes toward Punishment

Informant		Statement
Unwilling to punish		
Informant 1	#	Everyone has been copied. If I had to be upset every time they copy my recipes...
Informant 2	#	I am not afraid [of copying]. A chef who cooks one of my dishes is a chef without creativity, since every chef needs to create his own gastronomic world, his own cuisine style, his own sense of taste. My cuisine needs to have my tastes, not those of others.
Informant 3	#	[Punishment] is subjective. It depends on the way you are. I would tend to let it go, but there are others who get mad... In my opinion, it depends also a lot on how "mature" you are.
Informant 4	#	I have been copied a lot in time. On the other hand, a copy is always a copy, and my creativity goes beyond the dish, it is more conceptual.
Informant 5	#	The world is full of people copying without giving you credit for the paternity of a dish. If I should worry any time it happens. Still, of course, it is annoying.
Informant 6	#	I am not afraid of this [copying] happening, because I take it into account in the moment I pass the recipe. It would not be a problem at all. And this is also because if I am passing a recipe, it means that I already developed others, and I already moved on.
Informant 8	#	Here we are all so focused on what we do, that we do not care if others are copying.
Informant 12	#	I would hope that they would not basically copy me. But even if they did, I am not even worried about that.
Willing to punish		
Informant 7	#	If a chef I do not know calls me and asks me for a recipe, I would tell him: please, put my name on the menu. If he does not do it, then I would not give any more recipes to him in the future.
Informant 9	#	[A chef] copied half my menu. [...] So I sent him a pretty terse letter after that.
Informant 10	#	When people are not careful with that, it comes back to them, whether the chef happens to walk in the restaurant and see it or someone tells them about it, "Hey, someone has got this on their menu over there." You know, it is a small world. Everyone knows what everyone is doing.
Informant 11	#	You might say to somebody who has worked for you for three years is thinking about going to work for that guy. You might say, I would not recommend you go there. And that is not a restaurant I would recommend you go and I do not think you will learn what you want to learn because the chef just copies. I think eventually everything like that catches up with you.

TABLE 4.
Excerpts of Interviews Related to Variables Influencing Sanctioning

Informant	Statement
Visibility of the violation	
Informant # 7	[A top Italian chef] created some dishes that are considered his own, like for instance the open ravioli or the saffron risotto with the golden leaf. He was able to make clear that he was the owner of those concepts, of those dishes, so that when one cooks them the reference to his work is evident.
Informant # 8	If you replicate [a signature dish], it is a shame on you, not a problem for me, because it is so well known...
Informant # 11	A chef would not follow one of my recipes exactly and then serve it in their restaurant because eventually you are found out and people will say, "You know, this is crazy, you know, Joe the chef in Cambridge is serving the same dish that he learned how to cook over at Bob the Chef's over in Boston." You know, everybody knows where he got that idea and it really belongs to Bob the Chef. Chefs would know it. Customers may not. But the press would know. This affects professional standing.
Severity of the violation	
Informant # 3	If we had someone here located at a distance of 100 meters cooking the same things that we cook here, with the same style...well that would be problematic.
Informant # 9	[A chef] copied half my menu. I did not see the food on the plate. I was just reading it, I was like whoa. It is nice that you are looking at my website and all but come on. So I sent him a pretty terse letter after that.
Reputation of the violator	
Informant # 3	There is this young, emerging chef who has become famous for one of the dishes that he learned from his master. This is something that we all know. I mean it is known in our world. We are talking of an historical dish. We know that that guy has worked for that restaurant. One plus one gives two! It is not something that you created, or it is such a weird coincidence that, you know... [Interviewer: and if this guy should come here and ask you for a recipe, would you give it to him?] I would not have problems.
Informant # 4	The idea of this dish of mine was "used" by [a famous chef], and that was a little bit annoying because, in my perspective, such an important chef should not copy dishes in such an open way. [Interviewer: If he would ask you today for another recipe to insert in his menu?] I would be glad to pass it to him. [Interviewer: Despite he did not recognize your paternity on that dish he copied?] Yes. You know, he is [a name in the industry].
Exchange relationship with the violator	
Informant # 10	You never want to burn any bridges in the industry because you might need something. You might need some dinner napkins at the last minute because you are running low. Or you might need five pounds of swordfish. Or you might need a busboy really badly. Hence it is never good, I think, to burn bridges.
Informant # 12	I think we are pretty good about sharing help. Every place I have been, every city I have ever worked in, people have been very good about that. People know that they run out of stuff sometimes and they want to be able to come back to you.

TABLE 5.
Descriptive Statistics of Population and Sample

	Population (n=2,529)				Respondents (n=534)		Non-respondents (n=1,995)		T-test		Cohen's d
	Mean	S.D.	Min	Max	Mean	S.D.	Mean	S.D.	t	Sig	d
Forks	1.81	0.70	1	5	1.95	0.76	1.77	0.68	-5.3576	0.00	0.29
Average Price ^a	44.60	17.53	17.5	260	48.52	21.90	43.54	16.00	-5.8695	0.00	0.26
Stars	0.12	0.38	0	3	0.22	0.38	0.09	0.33	-6.9511	0.00	0.38

^a Expressed in Euros

TABLE 6.
Manipulated Variables and Corresponding Treatments

	High	Low
Geographical Proximity	Geographically very close to your restaurant	Geographically very distant from your restaurant
Similarity of Positioning	Cuisine Style and Ambience similar to your restaurant	Cuisine Style and Ambience different from your restaurant
Reputation	Zagalin: cuisine rating 28*. Comments: "creative", "innovative", "unique style". Chef has 20 years of experience in the industry	Zagalin: cuisine rating 20*. Comments: "lack imagination", "unoriginal", "ordinary style". Chef has 1 year of experience in the industry
Frequency of Review	Frequently reviewed by local media and customers (among the restaurants with more reviews)	Rarely reviewed by local media and customers (among the restaurants with fewer reviews)

* This rating is equivalent to a rating from Zagat™. It ranges from 0 to 30.

TABLE 7.
Variables, Measures, and Operationalization

Variable	Measure	Operationalization
Dependent Variable		
Second-Party Sanctioning	Likelihood (average of three measures) that the chef who provided information would directly sanction the chef described in the scenario in case of deviations from expected behavior	<i>If this chef copied the dish exactly (/copied the signature dish exactly/applied the technique to similar dishes or ingredients), how likely is that you would (7-point Likert scale):</i> - Provide NO more information? - Provide NO more help (e.g., missing ingredients, emergency labor)? - Tell other chefs about the attempt?
Independent Variables		
Peer Visibility	Likelihood that deviations from expected behavior would be noticed by other chefs	<i>How likely is it that this chef's misbehavior would be noted by other chefs? (7-point Likert scale)</i>
Direct Competition	Sum of Geographical Proximity and Product Positioning	Experimentally Manipulated
Favor Exchanges	Likelihood of exchange of material favors between the chef who provided information and the chef described in the scenario	<i>How likely is that in the next year this chef and you will exchange material favors (for instance, in the case of missing ingredients and personnel)? (7-point Likert scale)</i>
Reputation	Reputation	Experimentally Manipulated
Control Variables		
Respondent: Owner	Ownership of the restaurant	<i>What is your current position in the restaurant? (Chef owner/Executive chef/Chef de cuisine/Sous-chef/Pastry-chef/Chef de Partie/Other)</i>
Respondent: Male	Gender	<i>What is your gender?(Male/female)</i>
Respondent: Chain	Affiliation to a chain	<i>Does your restaurant belong to a chain? (yes/no)</i>
Respondent: Experience	Years of experience in the industry	<i>How many years of experience in the industry do you have?</i>
Respondent: Reputation	Culinary recognition	Chef is awarded Michelin star(s)
Frequency of Review	Frequency of Review	Experimentally Manipulated
Knowledge type	Dish, Signature Dish, Cooking Technique	Three conditions tested in survey

TABLE 8.
Descriptive Statistics and Correlations

Variable	Mean	Std. Dev.	Min	Max	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Second-Party Sanctioning	3.22	1.80	1.00	7.00	1.00										
2. Peer Visibility	4.77	1.86	1.00	7.00	0.11	1.00									
3. Direct Competition	0.03	1.40	-2.00	2.00	0.04	0.05	1.00								
4. Exchange Relationship	3.85	1.75	1.00	7.00	-0.20	0.14	0.05	1.00							
5. Reputation	0.00	0.71	-1.00	1.00	0.01	0.05	-0.03	0.06	1.00						
6. Frequency of Review	0.02	1.00	-1.00	1.00	0.02	0.00	0.01	-0.01	0.01	1.00					
7. Respondent: Owner	0.58	0.82	-1.00	1.00	0.03	-0.13	-0.03	-0.09	0.01	0.00	1.00				
8. Respondent: Male	0.64	0.77	-1.00	1.00	-0.03	0.05	0.05	0.09	-0.02	-0.04	-0.18	1.00			
9. Respondent: Chain	-0.88	0.47	-1.00	1.00	-0.02	0.07	0.04	0.02	0.05	0.09	-0.11	0.09	1.00		
10. Respondent: Experience	26.76	9.92	4.00	60.00	-0.01	-0.08	0.01	-0.05	-0.05	0.03	0.19	0.01	-0.03	1.00	
11. Respondent: Reputation	-0.63	0.78	-1.00	1.00	0.02	0.04	0.00	0.04	0.05	0.06	0.06	0.00	0.17	-0.07	1.00

TABLE 9.
Likelihood of Second-Party Sanctioning

	1	2	3	4	5	6	7	(n)
Likelihood that the chef who provided information would directly sanction the chef described in the scenario in case of deviations from expected behavior	22.0%	19.6%	18.4%	14.2%	12.4%	7.2%	6.1%	3096

TABLE 10.
Second-Party Sanctioning. Results of Fixed-Effects and Random-Effects
Regressions ^a

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se	coef/se
Direct Competition	0.050** (0.019)	0.050** (0.018)							0.059** (0.019)	0.059** (0.018)
Reputation			-0.117** (0.037)	-0.099** (0.036)					-0.085* (0.037)	-0.064 (0.036)
Peer Visibility					0.066** (0.021)	0.080** (0.019)			0.065** (0.021)	0.083** (0.019)
Exchange Relationship							-0.130** (0.019)	-0.145** (0.017)	-0.125** (0.019)	-0.146** (0.017)
Frequency of Review	-0.014 (0.026)	-0.010 (0.025)	-0.012 (0.026)	-0.008 (0.025)	-0.016 (0.026)	-0.011 (0.025)	-0.022 (0.026)	-0.017 (0.025)	-0.024 (0.025)	-0.020 (0.025)
Signature Dish	-0.006 (0.045)	-0.006 (0.045)	-0.006 (0.045)	-0.006 (0.045)	-0.006 (0.045)	-0.006 (0.045)	-0.006 (0.045)	-0.006 (0.045)	-0.006 (0.045)	-0.006 (0.045)
Technique	-0.231** (0.045)	-0.231** (0.045)	-0.231** (0.045)	-0.231** (0.045)	-0.231** (0.045)	-0.231** (0.045)	-0.231** (0.045)	-0.231** (0.045)	-0.231** (0.045)	-0.231** (0.045)
Respondent: Owner		0.042 (0.089)		0.043 (0.089)		0.057 (0.089)		0.019 (0.087)		0.039 (0.086)
Respondent: Male		-0.034 (0.091)		-0.033 (0.091)		-0.038 (0.090)		-0.004 (0.089)		-0.017 (0.087)
Respondent: Chain		-0.097 (0.154)		-0.086 (0.154)		-0.105 (0.152)		-0.088 (0.150)		-0.104 (0.147)
Respondent: Experience		-0.001 (0.007)		-0.002 (0.007)		-0.000 (0.007)		-0.002 (0.007)		-0.002 (0.007)
Respondent: Reputation		0.055 (0.091)		0.057 (0.091)		0.047 (0.090)		0.068 (0.088)		0.064 (0.087)
_cons	3.295** (0.032)	3.299** (0.248)	3.297** (0.032)	3.315** (0.248)	2.983** (0.106)	2.876** (0.265)	3.795** (0.078)	3.889** (0.251)	3.465** (0.131)	3.456** (0.267)
Number of observations	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096
F	10.362**		11.143**		10.991**		20.969**		15.505**	
Chi ²		43.147**		43.189**		53.284**		107.046**		141.837**
R ²	0.016	0.016	0.017	0.017	0.017	0.017	0.031	0.031	0.040	0.040
Hausman		Passed		Passed		Passed		Passed		Not Passed

^a Within-R² (ω) reported for fixed- and random-effects; * $p < 0.05$, ** $p < 0.01$

FIGURE 1.
Sample Scenario

Characteristics of restaurant:	<ul style="list-style-type: none"> - Zagalin: cuisine rating 28*. Comments: "creative", "innovative", "unique style" - Physically very close to your restaurant - Cuisine Style and Ambience similar to your restaurant - Frequently reviewed by local media and customers (among the restaurants with more reviews)
Chef:	<ul style="list-style-type: none"> - Chef has 20 years of experience in the industry

** This rating is equivalent to a rating from Zagat™. It ranges from 0 to 30.*

APPENDIX 1.
Evidence on Social Norms

Rules	Example Comment	Boundary Condition	Reported by
1) Don't copy exactly	I think that any of us, even when he takes the recipe of another, does it for taking inspiration out of a detail, rather than replicating the entire recipe. He will never replicate the same recipe. That is, he will capture some ideas out of that recipe and will use them to do other things. Usually it works like this. It is difficult that you go and replicate the same dish. Usually you take an idea that may be interesting to create something else.	Except if citing, see rule #2	Informant # 1; Informant # 2; Informant # 3; Informant # 4; Informant # 5; Informant # 6; Informant # 8; Informant # 9; Informant # 10; Informant # 11; Informant # 12.
2) Cite the source	If you cook the same recipe, you should write in the menu. Otherwise you do not replicate it in the same way, you interpret in your own way, and cook it in your own way.	Unless making substantial modifications, see rule #1	Informant # 3; Informant # 7; Informant # 8; Informant # 10; Informant # 11.
3) Don't pass on	There is one recipe that I do not give away. I have never given that away. I inherited that recipe. I feel like I am carrying that recipe, it does not really belong to me but I am carrying it. So it is not a recipe that I would give out or ever, I do not think I would ever publish it. But I would publish any recipe that I have developed.	Except (for some individuals) if sufficient time (~5 years) has passed.	Informant # 2; Informant # 3; Informant # 11.

Bibliography

- Alcácer J, Chung W. 2007. Location strategies and knowledge spillovers. *Management Science* **53**(5) 760-776.
- Allcott H, Karlan D, Möbius MM, Rosenblat TS, Szeidl A. 2007. Community size and network closure. *American Economic Review* **97**(2) 80-85.
- Allen JJ, Hyman DB, Pinckney DL. 1983. Transferring technology to the small manufacturing firm: A study of technology transfer in three countries. *Research Policy* **12**: 199-211.
- Almeida P, Kogut B. 1999. Localization of knowledge and the mobility of engineers in regional networks. *Management Science* **45**(7): 905-917.
- Ames DR, Flynn FJ, Weber EU. 2004. It's the thought that counts: On perceiving how helpers decide to lend a hand. *Personality and Social Psychology Bulletin* **30**(4): 461-474.
- Appleyard MM. 1996. How does knowledge flow? Interfirm patterns in the semiconductor industry. *Strategic Management Journal* **17**: 137-154.
- Argote L, McEvily B, Reagans R. 2003. Managing knowledge in organizations: An integrative framework and review of emerging themes. *Management Science* **49**(4): 571-582.
- Audretsch AB, Feldman MP. 1996. R&D spillovers and the geography of innovation. *American Economic Review* **86**(3) 630-640.
- Axelrod R. 1984. *The Evolution of Cooperation*. New York, NY: Basic Books.
- Axelrod R, Riolo RL, Cohen MD. 2002. Beyond geography: Cooperation with persistent links in the absence of clustered neighborhoods. *Personality and Social Psychology Review* **6**(4) 341-346.
- Baker G, Gibbons R, Murphy KJ. 2002. Relational contracts and the theory of the firm. *Quarterly Journal of Economics* **117**(1): 39-84.

- Barney JB. 1991. Firm resources and sustained competitive advantage. *Journal of Management* **17**: 99-120.
- Batson CD, Lishner DA, Cook J, Sawyer S. 2005. Similarity and nurturance: Two possible sources of empathy for strangers. *Basic and Applied Social Psychology* **27**(1): 15-25.
- Baum JAC, Mezias SJ. 1992. Localized competition and organizational failure in the Manhattan hotel industry, 1898-1990. *Administrative Science Quarterly* **37**(4): 580-604.
- Blau P. 1964. *Exchange and power in social life*. New York, NY: Wiley.
- Boston Magazine. 2010. O Ya.
http://www.bostonmagazine.com/restaurants/detail/o_ya1?&redirected=1.
 Last access: 30 July 2010.
- Bruni F. 2008. Coast to coast, restaurants that counts. *New York Times* (27 February 2008).
- Buenstorf G, Klepper S. 2009. Heritage and agglomeration: The Akron tire cluster revisited. *Economic Journal* **119**(537): 705-733.
- Camagni R. 1995. Global network and local milieu: Towards a theory of economic space. S. Conti, E. J. Malecki, P. Oinas, eds. *The industrial enterprise and its environment: Spatial perspectives*. Avebury, Aldershot, UK, 195-214.
- Carter AP. 1989. Knowhow trading as economic exchange. *Research Policy* **18**: 155-163.
- Chesbrough H. 2003. *Open innovation: The new imperative for creating and profiting from technology*. Harvard University Press: Cambridge, MA.
- Chung W, Alcácer J. 2002. Knowledge seeking and location choice of Foreign Direct Investment in the United States. *Management Science* **48**(12) 1534-1554.
- Chung W, Kalnins A. 2001. Agglomeration effects and performance: A test of the Texas lodging industry. *Strategic Management Journal* **22**(10) 969-988.

- Cialdini RB, Brown SL, Lewis BP, Luce C, Neuberg SL. 1997. Reinterpreting the empathy-altruism relationship: When one into one equals oneness. *Journal of Personality and Social Psychology* **73**(3): 481-494.
- Clay K. 1997. Trade without law: Private-order institutions in Mexican California. *Journal of Law, Economics and Organization* **13**(1): 202-231.
- Cohen WM, Levinthal DA. 1990. Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly* **35**: 128-152.
- Cohen WM, Nelson RR, Walsh JP. 2000. Protecting their intellectual assets: Appropriability conditions and why U.S. manufacturing firms patent (or not). Working Paper 7552, National Bureau of Economic Research, Cambridge, MA.
- Coleman JS. 1988. Social capital in the creation of human capital. *American Journal of Sociology* **94**: S95-S120.
- Coleman JS. 1990. *Foundations of social theory*. Cambridge, MA: Harvard University Press.
- Darr ED, Argote L, Epplé D. 1995. The acquisition, transfer, and depreciation of knowledge in service organizations: Productivity in franchises. *Management Science* **41**(11): 1750-1762.
- Davies A, Cline TW. 2005. A consumer behavior approach to modeling monopolistic competition. *Journal of Economic Psychology* **26**(6): 797-826
- Denzin NK, Lincoln YS. 1998. *Collecting and interpreting qualitative materials*. London, UK: Sage.
- Dierickx I, Cool K. 1989. Asset stock accumulation and sustainability of competitive advantage. *Management Science* **35**(12): 1504-1511.
- Durand R, Rao H, Monin P. 2007. Code and conduct in French cuisine: Impact of code changes on external evaluations. *Strategic Management Journal* **28**(5): 455-472.
- Edmondson AC, McManus SE. 2007. Methodological fit in management field research. *Academy of Management Review* **32**(4): 1155-1179.

- Eisenhardt KM. 1989. Building theories from case study research. *Academy of Management Review* **14**: 532–550.
- Ellickson RC. 1991. *Order without Law: How Neighbors Settle Disputes*. Cambridge, MA: Harvard University Press.
- Fauchart E, von Hippel E. 2008. Norms-based intellectual property systems: The case of French chefs. *Organization Science* **19**(2): 187-201.
- Feinberg SE, Gupta AK. 2009. MNC subsidiaries and country risk: Internalization as a safeguard against weak external institutions. *Academy of Management Journal* **52**(2): 381-399.
- Feldman Y, Harel A. 2008. Social norms, self-interest and ambiguity of legal norms: An experimental analysis of the rule vs. standard dilemma. *Review of Law and Economics* **4**(1): 81-126.
- Ferguson P. 1998. A cultural field in the making: gastronomy in 19th century France. *American Journal of Sociology* **104**(3): 597-641.
- Florey AT, Harrison DA. 2000. Responses to informal accommodation requests from employees with disabilities: Multistudy evidence on willingness to comply. *Academy of Management Journal* **43**(2): 224-233.
- Gans JS, Hsu DH, Stern S. 2008. The impact of uncertain intellectual property rights on the market for ideas: Evidence for patent grant delays. *Management Science* **54**(5): 982-997.
- Gans JS, Stern S. 2003. The product market and the market for 'ideas': Commercialization strategies for technology entrepreneurs. *Research Policy* **32**(2): 333-350.
- Gibbons R. 2003. Trust in social structures: Hobbes and Coase meet repeated games. In *Trust in society*, Cook K. (ed). Sage: New York, NY; 332-353.
- Gibbons R. 2005. Incentives between firms (and within). *Management Science* **51**(1): 2-17.

- Gomez C, Kirkman BL, Shapiro DL. 2000. The impact of collectivism and in-group/out-group membership on the evaluation generosity of team members. *Academy of Management Journal* **43**(6): 1097-1106.
- Gouldner AW. 1960. The norm of reciprocity: A preliminary statement. *American Sociological Review* **25**: 161-178.
- Graitson D. 1982. Spatial competition a la Hotelling: A selective survey. *Journal of Industrial Economics* **31** 11–25.
- Greif A. 1993. Contract enforceability and economic institutions in early trade: The Maghribi traders' coalition. *American Economic Review* **83**(3): 525-548.
- Greif A. 1994. Cultural beliefs and the organization of society. *Journal of Political Economy* **102**:912-950.
- Hausman J. 1978. Specification tests in econometrics. *Econometrica* **46**: 1251–1271.
- Hausman J, Hall BH, Griliches Z. 1984. Econometric-models for count data with an application to the patents–R&D relationship. *Econometrica* **52**: 909–938.
- Hirschman EC. 1986. Humanistic inquiry in marketing research: Philosophy, method, and criteria. *Journal of Marketing Research* **23**: 237-249.
- Holland JH. 1992. *Adaptation in natural and artificial systems*. Cambridge, MA: MIT Press.
- Holland JH. 1995. *Hidden order: How adaptation builds complexity*. Reading, MA: Addison Wesley.
- Horne C. 2004. Collective benefits, exchange interests, and norm enforcement. *Social Forces* **82**:1037-62.
- Ingram P, Inman C. 1996. Institutions, intergroup competition, and the evolution of hotel populations around Niagara Falls. *Administrative Science Quarterly* **41**(4): 629-658.
- Ingram P, Roberts PW. 2000. Friendships among competitors in the Sydney hotel industry. *American Journal of Sociology* **106**(2): 387-423.

- Ingram P, Silverman BS. 2002. The New Institutionalism in Strategic Management. *Advances in Strategic Management* **19**: 1-32.
- Ingram P, Clay K. 2000. The choice-within-constraints new institutionalism and implications for sociology. *Annual Review of Sociology* **26** 525-546.
- Inkpen AC, Tsang EWK. 2005. Social capital, networks, and knowledge transfer. *Academy of Management Review* **30**(1) 146–165.
- Jaffe AB, Trajtenberg M, Henderson R. 1993. Geographic localization of knowledge spillovers as evidenced by patent citations. *Quarterly Journal of Economics* **108**(3) 577–598.
- Jick TD. 1979. Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly* **24**: 602-611.
- Karpik L. 2000. Le Guide rouge Michelin. *Sociologie du Travail* **42**(3): 369-389.
- King BG, Soule SA. 2007. Social movements as extra institutional entrepreneurs: The effect of protest on stock price returns. *Administrative Science Quarterly* **52**: 413–442.
- Klepper S, Simons KL. 2000. The making of an oligopoly: Firm survival and technological change in the evolution of the U.S. tire industry. *Journal of Political Economy* **108**(4): 728-760.
- Klepper S. 2010. The origin and growth of industry clusters: The making of Silicon Valley and Detroit. *Journal of Urban Economics* **67**(1): 15-32.
- Klepper S. 2007. Disagreements, spinoffs, and the evolution of Detroit as the capital of the US automobile industry. *Management Science* **53**(4) 616–631.
- Kreps DM. 1990. *A course in microeconomic theory*. Princeton, NJ: Princeton University Press.
- Krugman P. 1991. *Geography and Trade*. Cambridge, MA: MIT Press.
- Lai K, Feldman M, Stoica I, Chuang J. 2003. Incentives for cooperation in peer-to-peer networks. In *Proceedings of the Workshop on Economics of Peer-to-Peer Systems*, Berkeley, CA. Available at:

- <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.14.1949&rep=rep1&type=pdf>. Last access: 30 July 2010.
- Lee GK, Cole RE. 2003. From a firm-based to a community-based model of knowledge creation: The case of the Linux Kernel development. *Organization Science* **14**(6): 633-649.
- Lee TW. 1999. *Using qualitative methods in organizational research*. Thousand Oaks, CA: Sage.
- Li JJ, Poppo L, Zhou KZ. 2010. Relational mechanisms, formal contracts, and local knowledge acquisition by international subsidiaries. *Strategic Management Journal* **31** 349-370.
- Lincoln YS, Guba EG. 1985. *Naturalistic inquiry*. Beverly Hills, CA: Sage.
- Lippman S, Rumelt RP. 1982. Uncertain imitability: An analysis of interfirm differences in efficiency under competition. *Bell Journal of Economics* **13**: 418-438.
- Maillat D. 1995 Territorial dynamic, innovative milieu and regional policy. *Entrepreneurship and Regional Development* **7** 157-165.
- Mandeville B. 2007 [1732]. *The fable of the bees: Or, private vices, public benefits*. London, UK: Penguin Classics.
- Marshall A. 1920 [1890]. *Principles of Economics*. London, UK: Macmillan.
- Maskell P, Malmberg A. 1999. Localized learning and industrial competitiveness. *Cambridge Journal of Economics* **23**(2) 167-185.
- Miles MB, Huberman AM. 1994. *Qualitative data analysis*. Thousand Oaks, CA: Sage.
- Murray EB. 2008. The knives come out. *Boston Magazine* (23 September 2008).
- North DC. 1990. *Institutions, institutional change and economic performance*. New York, NY: Cambridge University Press.
- Nouvel Observateur. 2005. "Michelin 2005: 3 étoiles pour Régis Marcon."
- Oliver P. 1980. Rewards and punishments as selective incentives for collective action: Theoretical investigations. *American Journal of Sociology* **85**:1356-1375.

- Ostrom E. 1990. *Governing the commons: The evolution of institutions for collective action*. New York, NY: Cambridge University Press.
- Ostrom E. 2003. Toward a behavioral theory linking trust, reciprocity, and reputation. In *Trust and reciprocity: Interdisciplinary lessons from experimental research*, Ostrom E, Walker J (eds). New York, NY: Sage; 19-79.
- Patton MQ. 2002. *Qualitative research and evaluation methods*. Thousand Oaks, CA: Sage.
- Perdue BC, Summers JO. 1986. Checking the Success of Manipulations in Marketing Experiments. *Journal of Marketing Research* **23**(November): 317-326.
- Peteraf MA. 1993. The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal* **14**(3): 179-191.
- Pisano G. 2006. Profiting from Innovation and the IP Revolution. *Research Policy* **35**: 1122-1130.
- Piskorski MJ, Gorbatai A. 2010. Testing Coleman's social-norm enforcement mechanism: Evidence from Wikipedia. Working Paper.
- Podolny J. 1993. A status-based model of market competition. *American Journal of Sociology* **98**: 829-872.
- Porter ME. 1990. *The Competitive Advantage of Nations*. New York, NY: Free Press.
- Poteete A, Janssen M, Ostrom E. 2010. *Working together: Collective action, the commons, and multiple methods in practice*. Princeton, NJ: Princeton University Press.
- Prakash A, Potoski M. 2006. *The voluntary environmentalist: Green clubs, ISO 14001, and voluntary environmental regulations*. Cambridge, UK: Cambridge University Press.
- Putnam RD. 1993. The prosperous community: Social capital and public life. *American Prospect* **13** 35-42.
- Putnam RD. 2000. *Bowling Alone*. New York, NY: Simon and Schuster.

- Rai AK. 1999. Regulating scientific research: Intellectual property rights and the norms of science. *Northwestern University Law Review*. 1-100.
- Rao H, Monin P, Durand R. 2003. Institutional change in Toque Ville: Nouvelle cuisine as an identity movement in French gastronomy. *American Journal of Sociology* **108**(4): 795-843.
- Rao H, Monin P, Durand R. 2005. Border crossing: Bricolage and the erosion of categorical boundaries in French gastronomy. *American Sociological Review* **70**(6): 968-991.
- Rasmusen EB. 2007. Norms in law and economics. American Law & Economics Association Annual Meetings, Paper 6.
- Ratanawarada A, Polenske KR. 2007. Measuring geography of innovation: A literature review. K. R. Polenske, ed. *The economic geography of innovation*; Cambridge, UK: Cambridge University Press; 30-59.
- Raustiala K, Sprigman CJ. 2006. The piracy paradox: innovation and intellectual property in fashion design. *Virginia Law Review* **92**(8): 1687-1777.
- Reed R, DeFillippi RJ. 1990. Causal ambiguity, barriers to imitation, and sustainable competitive advantage. *Academy of Management Review* **15**: 88-102.
- Richman BD. 2006. How community institutions create economic advantage: Jewish diamond merchants in New York. *Law and Social Inquiry* **31**(2): 383-420.
- Riolo R, Cohen MD, Axelrod R. 2001. Evolution of cooperation without reciprocity. *Nature* **414** 441-443.
- Robson MJ, Katsikeas CS, Bello DC. 2008. Drivers and performance outcomes of trust in international strategic alliances: The role of organizational complexity. *Organization Science* **19**(4) 647-665.
- Rumelt RP. 1984. Toward a strategic theory of the firm. In *Competitive Strategic Management*, Lamb R (ed). Englewood Cliffs: Prentice-Hall; 556-570.

- Shaver JM. 2005. Testing for mediating variables in management research: Concerns, implications, and alternative strategies. *Journal of Management* **31**(3) 330-353.
- Shih W, Pisano G, King AA. 2008. Radical collaboration: IBM microelectronics joint development alliances. Harvard Business School Case 608-121.
- Sigmund K, Nowak MA. 2001. Tides of tolerance. *Nature* **414** 403-405.
- Singh J. 2005. Collaborative networks as determinants of knowledge diffusion patterns. *Management Science* **51**(5): 756-770.
- Song J, Almeida P, Wu G. 2003. Learning by hiring: When is mobility more likely to facilitate interfirm knowledge transfer? *Management Science* **49**(4) 351-365.
- Sorenson O, Audia PG. 2000. The social structure of entrepreneurial activity: Geographic concentration of footwear production in the United States, 1940-1989. *American Journal of Sociology* **106**(2) 424-461.
- Szulanski G. 1996. Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic Management Journal* **17**: 27-43.
- Teece DJ. 1986. Profiting from technological innovation. *Research Policy* **15**(6): 285-305.
- This H. 2006. *Molecular gastronomy: Exploring the science of flavor*. New York, NY: Columbia University Press.
- Tirole J. 1997. *The theory of industrial organization*. Cambridge, MA: MIT Press.
- Traverso A, Helterman J. 2008. The 50 best restaurants. *Boston Magazine* (23 December 2008).
- Ullmann-Margalit E. 1977. *The emergence of norms*. Oxford, UK: Oxford University Press.
- von Hippel E. 1987. Cooperation between Rivals: Informal Know-How Trading. *Research Policy* **16**: 291-302
- von Hippel E. 1994. Sticky information and the locus of problem-solving: Implications for innovation. *Management Science* **40**(4): 429-439.

- Zaheer A, McEvily B, Perrone VA. 1998. Does trust matter? Exploring the effects of interorganizational and interpersonal trust on performance. *Organization Science* **9** 141-159.
- Zahra S, George G. 2002. Absorptive capacity: A review, reconceptualization, and extension. *Academy of Management Review* **27**(2): 185-203.
- Zasu Y. 2007. Sanctions by social norms and the law: Substitutes or complements? *Journal of Legal Studies* **36**(June): 379- 396.
- Zhao M. 2006. Conducting R&D in countries with weak intellectual property rights protection. *Management Science* **56**(7): 1185-99.
- Zucker LG, Darby MR, Armstrong J. 1998. Geographically localized knowledge: Spillovers or markets? *Economic Inquiry* **36**(1): 65-86.
- Zucker LG, Darby MR, Brewer MB. 1998. Intellectual human capital and the birth of US biotechnology enterprises. *American Economic Review* **88**(1) 290-306.